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JAMES E. RUSSELL, *Editor*
Dean of Teachers College

CLYDE J. TIDWELL, *Managing Editor*
Director, Bureau of Publications

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Bureau of Curriculum Research, Bulletin No. 1

RATING ELEMENTARY SCHOOL COURSES OF STUDY

By Florence B. Stratemeyer and Herbert B. Bruner

This is the first of a series of reports of the Bureau of Curriculum Research and contains a report of the results secured from an evaluation of 9,000 elementary school courses of study in practically all fields of subject matter to determine outstanding present practice. This study, which utilized more than 35,000 judgments, presents (1) the guides employed by the judges in estimating the relative worth of courses of study; (2) the courses (in the various subject fields) selected as most nearly conforming to the judged best points of the criteria; (3) a preliminary report of trends and tendencies in elementary education as indicated by the selected courses.

This report, with its guides for judging curriculum merit and lists of outstanding courses, is replete with valuable suggestions that should be of immediate and genuine service to course of study committees in the field.

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VOLUME XXVIII NUMBER 3

Teachers College
RECORD

November, 1926

THE BIGGEST THING IN TEACHING*

By FRANK M. McMURRY
Professor of Education, Teachers College

HOW would I plan, if I could live my life over again, guided by my present knowledge?

I would go into Teaching, of course; but I would make far more directly for the biggest thing in Teaching than I ever have in the past.

What is that? Let us see. The biggest lack among students is not ability but fire. It is a lack of flaming purposes.

Accordingly, the leading test of my instruction that I have applied for many years has been the extent to which I could get my students excited over educational ideas. If after a class period was over, they lingered in the halls in discussion and carried the discussion over into the lunch period, I felt encouraged and if, now and then, in their excitement they showed a fighting spirit in consequence of the convictions they had reached, I felt that my instruction was attaining a reasonable degree of success.

Such devotion to aims is so vital because it indicates the energy with which they are likely to work in the future. Most people have a lot more ability than they are using; but they never know the full extent of their power till they are on fire with purposes of some sort. Devotion to purposes, in other words, is the motive power in life.

Yet it is the rule for university students to come to class without

*An address at the dinner given in honor of Professor McMurry, July 23, 1926. An account of the dinner and the other addresses are printed on pages 297 to 300.

definite objects in mind. This is true even though they pay their own way and pay for each period as much as the price of a good theatre; and it is true even though they are urged to bring to class vital problems of their own for consideration. They have a well established habit of waiting to be directed and led by their instructors. And I am convinced that just as they are accustomed to enter classes with "nothing particular on their minds," so they go out into life waiting to see what will turn up rather than determined to accomplish certain aims.

There are two reasons for this state. One is that even mature students are not sure of their own tastes, interests, and abilities. For example, when I was on my way to study education in a German university at the age of twenty-six, I had few positive ideas about myself; but I remember one negative conviction that was deeply fixed; namely, that whatever I might do in the future, I would avoid discussions. Although I had hardly shared in any discussions up to that time, I had had to listen to many; and I had made up my mind that they got nowhere; they were all "talk." Yet within a year and a half after that time, discussion had become my preferred method of study; and during the last thirty-five years I have done little else than lead discussion as a method of instructing students. One reason why students do not become devoted to definite goals is that they do not understand themselves; they do not know what they can best undertake.

The other reason is that they lack faith in their own past, which means faith in themselves. The past experience of my students has usually included eight years in elementary school, four years in high school, from two to four years in college or training school, and from five to ten years in teaching. That is, they have averaged not less than twenty years in contact with class instruction. What a rich experience either for or against all sorts of classroom procedures each of them has had! Yet when they have met for the discussion of a forty-minute period of elementary instruction that they have observed they have generally seemed much embarrassed; and their most common remark when I have upbraided them for not offering valuable ideas about the teaching has been that they "knew nothing about it." They have not seemed conscious that they had, each, a rich mine of experience along the desired line on which they might

draw. And one of my first duties has been to try to persuade them that their past experience was worthy of respect. But it has taken at least several months to convince them of this fact. Meanwhile it has often been amusing to note the relieved expression on their faces when they were assigned some library references for study. The easiest thing is to collect ideas of other people and the hardest thing is to have ideas of one's own.

All this means that most university students have not *found themselves.* They do not understand themselves well enough and feel enough faith in themselves to set up intelligent goals and pursue them with zeal. They lack the intellectual self-respect and independence to do that. And it must be remembered that lack is due rather to bad training than to a want of native ability. What a waste!

Here we see the greatest function of the teacher; it is *to help students find themselves!* Many teachers do this to a more or less extent; and many older people can recall the benefits of such efforts. I remember that a man perhaps thirty years of age once entered my office and shed tears copiously. When I asked him what was the matter, he replied that he guessed he wasn't good for much. He had been a student at Teachers College the year before and had expected to teach. But not finding a desirable position during the summer he had returned for further study. What had especially upset him was the fact that one of our faculty, knowing about his failure to find a position, had expressed a lack of confidence in him and he himself did not have enough self-confidence to withstand the shake-up.

I happened to know the man better than I did most of my students and I was able to say to him, "Don't you be worried. You have some of the earmarks of the born teacher. I have seen them. Brace up! You have it in you to succeed to an unusual degree in teaching." I am sure that he felt that I was sincere and I suspect that he believed what I had said about him. He was in sore need of faith in himself and my faith in him helped to establish it. He was cheerful during the rest of that year and now for many years has been a leading educator in his state.

But one cannot exert such an influence on a student without knowing him well and feeling a real faith in him, that is, without a close friendship with him. As I see it, therefore, the greatest test of a

teacher is found in the extent of his friendship with students and in the extent to which he utilizes that friendship for their benefit. Teaching includes two factors: one is instruction, which is concerned with knowledge and intellectual qualities; the other is affection or sympathy, which is concerned with personal relations and emotions. And the greater of the two is the latter; a warm heart, leading to strong friendship, is a bigger thing in teaching than skill in instruction.

That does not mean, however, that the instruction may be neglected. It is the main means by which teachers and students can know each other; and if it does not command a high degree of respect on the part of the student the growth of friendship is blocked. Skill in instruction must, therefore, be provided for. But knowledge and right mental habits are only intermediate goals.

How would these facts influence me, if I could live my professional life over again? I would not leave the cementing of friendships so much to accident. I would set aside far more time for meeting students; if possible, giving as many hours to it as I gave to instruction. I would hope to meet many more of the diffident students, who would never come to me of their own accord. I would make more of a study of students when I was with them, and I would assume that advising with them on any and all matters that they cared to talk over seriously was my highest function.

There certainly is such a thing as growth in capacity for friendship, and I should hope to experience it. It would include a widening of one's sympathies for students, a quickening of one's responses to their needs, an increasing faith in their possibilities, and a deepening of affection that would make one more and more generous toward them. We all believe in the growth of intellectual qualities; why should we not believe just as firmly in the growth of emotional qualities? And the outcome should be some degree of skill or wisdom in advising with students.

My reason for discussing this subject here is that, in spite of its supreme importance, it has come to be much neglected. We have become so much interested in scientific instruction, in measuring and testing and proving, that the responsibility of teaching apart from instruction receives much less attention now than it did forty years ago. The absence of recent literature on the subject tends to verify this statement. A friend of mine who has been making a study of

the "Personal Influence of the Teacher" with a view of writing upon it has recently told me that he could find little literature of value upon it, and nothing so good as Bishop Huntington's little pamphlet of some twenty-five pages with the title "Unconscious Tuition" published at least forty years ago: If faith, hope, and love are the supreme things in life—the only things that abide—their corresponding rank in education is a fact that should receive far more attention.

A VOCABULARY OF SCIENTIFIC TERMS FOR HIGH SCHOOL STUDENTS

By S. R. POWERS

Associate Professor of Natural Sciences, Teachers College

TEXTBOOKS in high school science are often criticized because of their difficulty, but until recently no effort has been made to define the elements which occasion difficulty. Consequently, teaching methods have not been developed for so presenting the troublesome elements that the learner may properly master them. Of the many elements of learning that are essential to accomplishment in science, on the high school level, it is likely that none is more fundamental than the vocabulary of the subject. Furthermore, there is abundant evidence, obtained through the use of standard tests, that students do not secure an adequate command of the vocabulary of the sciences which they study. Reports from the use of the commonly accepted standard tests of achievement in general science, biology, physics, or chemistry are equally convincing. Terms which the teacher with even limited training in science may presume to be very easy, often occasion much difficulty to immature readers. This difficulty is so general that teachers who are interested in improving achievement in science may properly direct their efforts toward accomplishment of more complete mastery of the important terminology of these subjects. An objective determination of the important vocabulary should therefore be of great value to science teachers. In addition to its value as an aid in teaching it has value in that it reveals to teachers and to writers of textbooks the enormousness of the technical vocabulary which authors are using.

In a previous article [1] the writer reported the number of "uncommon" words used in certain textbooks in general science, general biology, and chemistry. In this, as in the previous article, a word is called "uncommon" if it is not contained in the *Teacher's Word*

[1] S. R. Powers, "The Vocabularies of High School Science Text Books," *Teachers College Record*, 26:368-82.

Book,[2] the list of words found by Professor Thorndike to be of most importance on the basis of range and frequency of usage in the "world's reading." The present article is an extension of the previous one and includes a list of the "uncommon" words found to be most important on the basis of range and frequency of usage in science texts and in other reading material about scientific subjects.

A large number of my students have made small contributions to this work and a much smaller number have contributed very liberally of their time and effort. Clerical assistants and trained workers have aided in assembling and alphabetizing the words. The workers were instructed to list in alphabetical order all words occurring in the sources and not contained in the *Teacher's Word Book*, following the same general method as was used by Professor Thorndike.[3] Exception was made to his procedure in the case of chemical names, like *copper sulfate;* biological terms, like *adder's tongue* and *Agrimonia parviflora;* and in a few other cases in which two words were used as a single term.

The sources of the reading material from which this list of terms has been compiled is shown in the following tabulation, together with the approximate number of running words in each source.

TABLE I

Two Texts in General Science	290,000	words
Six Texts in General Biology	800,000	"
Two Texts in Chemistry	290,000	"
Two Texts in Physics	355,000	"
Three Popular Scientific Books	250,000	"
Miscellaneous Material, (including 50 magazine articles on science subjects)	125,000	"
Approximate Total of Running Words	2,110,000	"

The complete list of uncommon terminology from all the sources consulted was a vocabulary of some 14,000 terms. There were among these many compound words and other derivatives which would hardly cause difficulty to readers if the roots from which they were derived were known. Consequently the list was reduced by eliminating the easy derivatives. Hyphenated words were not counted unless

[2] E. L. Thorndike, *The Teacher's Word Book*. Bureau of Publications, Teachers College.
[3] *Teacher's Word Book*, p. v.

clearly the compound word conveyed a meaning which was not suggested by the words from which it was derived. The word *alcohol-containing* was crossed out while the word *step-up* was not. Similarly, simple words ending in *like*, such as *rubberlike*, those ending in *less*, like *rustless;* and words prefixed by *un*, like *unused*, were eliminated. The revised list contained 7,948 uncommon terms. By far most of the reduction came from the elimination of hyphenated words. Table II shows the number of the uncommon terms that were used in each source. The three popular scientific books and the miscellaneous material have been grouped together as one source.

TABLE II

General Science	1404	words
General Biology	3956	"
Chemistry	1973	"
Physics	1302	"
Other Material	3602	"
Total	7948	"

The test of range and frequency of usage would rate many of these terms as of little importance. Approximately 35 per cent of the revised list were terms which occurred with but a single frequency and a considerable number of percentages occurred with frequencies of 2 and 3. On the other hand, there were 57 words that occurred with a frequency of more than 200. The word *oxygen* was found to have highest frequency. It was followed in order by *hydrogen, bacterium(a), nitrogen, molecule, carbon dioxide, gram,* and *protein.*

In order to make the list useful to teachers it was necessary to reduce it still more—in fact, to make it include only such terms as might, by a reasonable definition of the word, be rated as important. The definition which was used is purely arbitrary. A word is called important if its frequency from all sources is as much as 10. Words with frequencies less than 10 were called important if they appeared in at least three of the five sources. The total number of important terms in the list prepared by using this definition is 1,828. The extent to which these important words are used in each of the five sources is shown as Table III.

TABLE III

General Science	812	words
General Biology	1309	"
Chemistry	793	"
Physics	713	"
Other Material	1191	"
Total "Important" Terms	1828	"

This list of important words is printed as an appendix to this article. A key is used to indicate the range and frequency of use of each term. In the discussion which follows, it will be convenient to use the word "composite" when referring to the longer list (7,948 terms) and the word "important" when referring to the shorter list (1,828 words). It should be clear that all the important terms are included within the composite list.

These considerations furnish a criterion for making some evaluation of practices in textbook writing and suggest the need for care on the part of authors. By our definition, 77 per cent of the words in the composite list cannot be counted as important. If this definition is too rigid, make it more liberal and it will still be difficult to get 50 per cent of the technical terms used by textbook writers into a list which may be defined as important on the criterion of usefulness in a liberal education. The evidence is convincing that the technical tasks are too large for students, not only because we know from objective tests that the tasks are not mastered, but also because there is such a small chance that the student will ever see the words again outside his text. It may be argued that the student should be equipped with a large "margin of safety" of words in order that he may be prepared for any emergency, and this might be granted if the words were actually learned. But the fact that the student does not learn the great mass of them would seem to make this argument invalid.

Table IV shows, for each source, the percentage of the words in the composite list that are contained in the important list.

These percentages are an indication of the extent to which the vocabulary of a given book is useful outside the text in which it is written. The largest percentage of the terms, used in general science, passes this test of usefulness, and this is to be expected since this course draws its content in part from each of the specialized fields which

TABLE IV

General Science	58	per cent
General Biology	33	" "
Chemistry	40	" "
Physics	55	" "
Other Material	33	" "

follow it in the course of study. The smallest percentage of the terms, used in general biology, passes this test of usefulness. The vocabulary of physics ranks nearly as high as the one for general science. A large percentage of the technical terms of science textbooks does not appear in more than 2,000,000 running words of printed matter about science, except in the text in which they are written and here with but a single frequency, in the case of approximately 40 per cent of the terms. It would seem to follow from this finding that the vocabulary burden of these books is unnecessarily and unsupportably large. The status of the texts may be further clarified by attention, in order, to the texts of each grade level.

GENERAL SCIENCE

There are two important objectives of general science that should be kept in mind while making interpretation of the points presented in this article. These are (1) to enlarge the student's scientific vocabulary; and (2) to give, for purposes of exploration, some insight into the nature of each of the special sciences that are taught in the grade levels which follow. This paper is presented as factual material which when properly interpreted may point the way to a more complete accomplishment of these as well as other valid objectives.

The authors of general science texts have been, for the most part, individuals whose training has been from the point of view of specialized science. It has not been easy for these writers to refrain from introducing into their books too great a burden from the technical terminology of their specialty. Of the total number of words (7,948) in our composite list, 1,404 were used in the two general science texts. Approximately 320 of these were used in both books. The remainder, approximately 1,080 words, came in about equal numbers from each book. There were, therefore, a total of about 860 uncommon terms, exclusive of hyphenated words and derivatives of

simple words, obtained from each text. The extent to which these are taken from the vocabulary of the special sciences is revealed by the fact that about 85 per cent of them find some usage in at least one of the other sources. It is to be expected, and not to be deplored, that the terminology of the special sciences has been used in general science. But the number of such terms which have been used is surely too large.

The fact just mentioned may be cited as evidence that the terminology which has been used is important. It is significant that the words used shall find usage in later reading. Of the terms in our important list almost 100 per cent are used in later reading. But a fact to be emphasized is that approximately 40 per cent of the terms in our composite list which are used in general science texts have but a single frequency in these books and that about an equal percentage of those in our important list which are found in general science texts are used in these with this frequency. Their position in the important list is established by their frequency of use in the other sources. The propaedeutic value of general science, incidental but withal important, might be presumed to be considerable if students actually acquired a mastery of the terminology of their text.

Examples of words of single frequency in one of the texts examined are *acetanilid, aeriation, ammonium nitrate, aniline, antibodies* and *aspergillus*. In the other book are *floriculture, fungi, glaciate, gopher, humid,* and *hydrochloric acid*. It is evident that one exposure to terms such as these is wholly inadequate. For this reason there seems to be support for dropping from general science a large number of single frequency words, especially when it is possible to substitute in their places simple phrases which will carry the meaning. Where it is not possible to substitute phrases and carry the meaning, authors should try to use the terms in varied settings.

The results from the use of objective tests show clearly that these elements of learning are not mastered in general science. Words like *capillarity, diffusion, armature, differential* and many others are very difficult for ninth grade readers, so difficult in fact that only a small percentage are able to make the proper associations when these words are used in simple test items of the multiple-choice type.[4]

Two essentials to satisfactory accomplishment are, first, that the

[4] Evidence obtained from experimental work with tests for general science.

task be such that it is within the pupil's capacity, and, second, that proper teaching methods be employed. The evidence is convincing that satisfactory accomplishment in general science is not being attained by the methods now in use. What could be done with improved methods remains to be demonstrated. However, efforts to improve instruction are now working in two directions: one, toward simplifying the task; the other, toward improving the methods.

Evidence that the need for simplification has been recognized is revealed by examination of new books and revisions which have recently appeared. The authors of two of the five most recent of these make special mention in their prefaces of the methods which were used to keep the vocabulary within the range of ability of eighth and ninth grade readers and examination of the content reveals that they have been, at least in some measure, successful. Examination of the other three shows that the authors of these have not been unmindful of the need for careful attention to this cause of difficulty.

It should be emphasized that the objective—to extend the pupil's scientific vocabulary—is an important one for general science. The most useful words should, therefore, be retained; but opportunity should be offered to the student to acquire some familiarity with them through more frequent usage. In the absence of an adequate standard for defining the vocabulary ability of eighth and ninth grade students it is probably best, for the accomplishment of the objective, to err on the side of brevity. It is quite certain that the authors of some of the older general science texts have erred on the other side.

GENERAL BIOLOGY

The status of general biology is in some respects similar to that of general science. It, too, is a reorganized course and in the reorganization content has been drawn from each of the specialized fields of biology. As a result the authors of texts which have been written as general biology have used much of the technical terminology of each of the special fields. In consequence many of the books which have appeared are probably more difficult than the texts in botany, zoology, and human physiology which they were to displace. These are likely to be unduly technical until textbook writers make an issue of vocabulary difficulty and set themselves definitely to the task of simplification.

It has already been shown that the general biology texts, although prepared for use on the ninth and tenth grade level, use on the average more uncommon words per page than any other of the high school books examined.[5] Of the 7,948 words in our composite list, 3,956 are used in the biology texts (Table II). Of these but 33 per cent (Table IV) have sufficient frequency and range of use to be given a place in our important list. This low percentage is evidence of the fact that a large number are used with a single or very low frequency and find no usage in the other sources which were examined. About 85 per cent of the terms of our composite list which were used in general science found usage in some of the other sources. Only about 50 per cent of terms from biology have this support. By the same criterion, that the uncommon vocabulary of general science is rated as important, a large percentage of the uncommon words of the biology texts is rated as unimportant. And, on psychological grounds, it is difficult to support the practice of introducing into ninth and tenth grade texts a miscellaneous assortment of terms used in the scientific classification of plants and animals and terms used to name the detailed structures of biological organisms. Surely they do not have functional value for tenth grade boys and girls, and it appears that it is only on traditional grounds that support may be found for them.

It should not be understood that this is a denial of the educational value of an elementary presentation of the classification schemes. These may be presented so as to show how plants (or animals) are interrelated. Its educational value is established if it contributes to the accomplishment of this objective.

Approximately 40 per cent of the terms from the composite list which are used in biology are used in this source with but a single frequency. Some illustrations of words which are used with this frequency in one text are *Coleoptera, colloid, Confera, bombycina, Cro-Magnon* and *cytolysis*. Somewhat more than half of the uncommon words in these texts were used but once.[6]

Of the words in our important list which are used in biology only about 20 per cent occur with one usage. The corresponding percentage for the general science terms has been shown to be approximately 40. It has already been shown that a large percentage of the

[5] "Vocabularies of High School Science Text Books," *Teachers College Record*, 26:368-82.
[6] *Ibid.*, Table VI.

biological terms did not get into the important list because of low frequency. It follows from this that many of those in the important list are there because of their frequencies in the single source. Approximately 50 per cent of the terms in the composite list which are used in biology are not used in any other source, and about 20 per cent of those in the important list have their sole usage in biology. The corresponding percentages for the general science terminology are 20 and nearly zero. By this test, and probably by any test, a large percentage of biological terminology is low in functional value. This is particularly unfortunate, for there is so much in this field that is important and yet neglected.

With this issue clarified authors of biology texts will surely reduce the number of technical words in their books and will plan their writing so that, in so far as possible, the words which are introduced will be used more than once. The biologies examined, with one or possibly two exceptions, actually occasion more reading difficulty through use of uncommon terminology than do the texts for either physics or chemistry.

CHEMISTRY

General science and general biology are "reorganized courses." Chemistry is not. Chemistry textbooks of to-day are largely the product of gradual evolution and, like many things in biological evolution, this has not resulted in perfect adaptation to existing needs. Support for the present content is found, for the most part, in tradition.

In the previous article[7] it was shown that authors of chemistry texts make somewhat smaller use of uncommon words than authors of biology texts and that in the chemistry texts there is a somewhat smaller percentage of words with a single usage. It should be mentioned that this is so in spite of the fact that these books include the names of a large number of chemical compounds, many of which are mentioned but once.

Reference to Table IV shows that but 40 per cent of the terms in the composite list which were used in chemistry are in the important list. Chemistry, like biology, has a unique terminology. In biology it is classification and in chemistry it is names of compounds. A large number of these are not in our important list, nor is it likely that

[7] "Vocabularies of High School Science Texts," Table VIII.

they will be in any other list of terms which are judged on any adequate basis to be important in a program of liberal education.

Of the words in the composite list which are used in chemistry about two thirds are used in one or more of the other sources. Approximately 95 per cent of the terms from chemistry in the important list are used in one or more of the other sources. About 20 per cent of the words from chemistry which appear in the important list are used but once in this source, while about 30 per cent of those which appear in the composite list are used in chemistry with a frequency of but one.

In the two books examined there was a total of 2,446 uncommon terms. There were 1,786 in one book and 1,535 in the other. Approximately half the number in each book, or 875, are common to both. Elimination of easy derivatives reduced this number from 2,446 to 1,973 (Table II). In this aggregate list of 1,973 there were some 550, or nearly 30 per cent, which had a total frequency of three or less. Only 67 of these, or 12 per cent, were used in both books. This is evidence that the authors rate these terms as of relatively low importance. These terms were made up as a list of "Little Used Terminology of High School Chemistry" and sent to seventeen chemistry teachers with a request that the teachers indicate concerning each word whether they consider it essential to the high school course in order to give the student a proper working knowledge of the subject; whether they consider it non-essential and one which should be eliminated from high school textbooks; or whether they are in doubt and unable to express a judgment.[8]

The returns showed that there was but one term, *blast furnace,* which all agreed was important and but sixteen that were rated as essential by fourteen of the seventeen judges. Slightly more than one fourth of the words, or 147, were rated as essential by as many as nine of the judges. On the other hand, there were but two words, *baudelot* and *Beatrice,* which all agreed were non-essential; 53 were considered non-essential by fourteen of the judges; and 218, or nearly 40 per cent, were rated as non-essential by as many as nine of the judges. Among the words considered non-essential by most of the judges are chemical names of organic compounds, like *alkyl oxide* and *hexadecane;* names of commercial chemical products, like *forma-*

[8] The author acknowledges his indebtedness to Mr. J. H. Jensen, Northern Normal and Industrial School, Aberdeen, S. D., for compiling the summary of these judgments.

cone and *sulphuma;* and names of minerals, like *rutile* and *cairngorm.* For the most part the names of inorganic chemicals, like *dichromic acid, hydrogen chlorite* and *nickel arsenide,* which were voted non-essential, had only a small majority. On the other hand, a large number of terms of this kind were placed in the essential group by a fairly good majority.

Of the 1,973 uncommon terms used in the two chemistry texts, 856, or nearly one half, are names of elements, chemical compounds, commercial products, and minerals. It is hardly to be expected that students who use the books can become familiar with these substances. Furthermore, a large majority of these are terms which the student will never see again after he has finished his course in chemistry. On this account they are devoid of value in a program of liberal education. With this issue clarified authors of textbooks will face it intelligently and eliminate from their writings terms which do not contribute to the accomplishment of valid and definable objectives. The promotion of chemistry as an appropriate subject in a program of liberal education demands it.

Notwithstanding the fact that it is hard to find support for many of the terms used in high school chemistry on the basis of utility, teachers and authors are extremely reluctant to release any of the content which tradition has handed down to them. The fact that so many of the "little used terms" were rated as unimportant by a majority of the judges, together with the fact that many more are highly technical and used only in specialized work, suggests the conclusion that the vocabulary burden of chemistry texts could be greatly reduced if authors were sensitive to the issue and faced it intelligently.

In chemistry, as in other subjects, there is abundant evidence obtained through the use of objective tests that students do not learn the mass of material which is presented to them through their text. Not only do they fail to master the mass of content but they also fail of the more important objective, namely, to acquire an appreciation of what the development of chemistry means in modern social and industrial life.

PHYSICS

The previous report did not cover the vocabulary of physics. It was limited to general science, general biology, and chemistry. The

same method of study has now been applied to two of the commonly used texts in physics. These will be referred to as Texts A and B. Text A contained 1,526 uncommon terms and Text B contained 1,461. Seven hundred twenty-seven, or about one half the number in either book, were common to both. The total number of different words from the two books was 2,260.

Table V shows the frequency with which these words were used.

TABLE V

Text A			Text B		
Frequency	Words	Per Cent of Total	Frequency	Words	Per Cent of Total
Occurring but Once	696	45.6	Occurring but Once	680	46.5
Twice	207	13.5	Twice	215	14.7
Three times	129	8.4	Three times	132	9.0
Four times	94	6.1	Four times	71	4.8
Five times	50	3.3	Five times	58	3.9
More than Five times	350	22.9	More than Five times	305	20.8
Total	1,526			1,461	

There is nothing in the physics vocabulary which is quite comparable to the terms of classification used in biology and the names of chemical compounds used in chemistry, and it is likely that it is on this account that the list of uncommon terms in physics is somewhat shorter. Authors of texts for both physics and chemistry show about the same tendency to use words with a single frequency, but in the physics texts a somewhat larger proportion of the single frequency words are easy derivatives. The number in the composite list was reduced from 2,260 to 1,302 (Table II) by elimination of the easy derivatives; whereas the elimination of the easy derivatives from the chemistry list reduced the count only from 2,446 to 1,973.

The words of highest frequency (each used more than 100 times) in Text A are in order: *molecule, velocity, centimeter, gram, vibration, magnetic* and *potential.* In Text B: *centimeter, gram, voltage, ohm, friction, ampere, cubic, magnetic, generator* and *armature.*

Next to general science, the largest percentage of the words in the composite list which were used in physics are contained in the impor-

tant list (Table IV). About 25 per cent of the words in the composite list which are used in physics have their sole usage in this source. Of these in the important list only about 5 per cent have their sole usage in physics. There is therefore, except for general science, a somewhat better chance that the words used in physics will find usage in some other source than the words from either of the other books. These considerations suggest the conclusion that the vocabulary of physics is less open to criticism because of difficulty than the vocabulary of either chemistry or biology.

"OTHER MATERIAL"

But little interest will be attached to a statistical analysis of the vocabulary of the other material. The importance of this list is that it serves as a measure, albeit an inadequate one, of the usefulness of the textbook vocabulary in other reading. Of the first 680 words in the composite list, 306 were used in "other material" outside the textbooks, and of these 119, or nearly one third, had their sole usage in the "other material." Most of the 119 occurred with low frequency. There was in fact but one of these (*amyl,* frequency 11) that had sufficient frequency to get into the important list. There are, in the composite list, 3,602 terms which have some usage in the "other material." Of these 1,191 have sufficient frequency from all sources to be given a place in the important list. Of the words in the important list which are used in "other material," about one sixth have a frequency of 1 in this source.

SUMMARY

A tabular summary of the statistical analysis will assist the reader in making interpretations. The percentages in Table VI were computed from figures obtained by counting from an unselected portion of the composite list and are therefore approximations.

In summary it is sufficient to call attention to the fact that authors of textbooks are using in their books many words which children will never see again after they have finished the required classroom work. If the factual material of this article serves to make authors sensitive to this issue so that in their writing they will face it intelligently, the article will in the opinion of the writer have served an important purpose. Intelligence in regard to this issue is of paramount impor-

TABLE VI

	General Science 2 Books	General Biology 5 Books	Physics 2 Books	Chemistry 2 Books	Others
1. Average number of words in books, including easy derivatives	1324	2040	1493	1660	
2. In composite list from each source, easy derivatives not included	1404	3956	1302	1973	3602
3. In important list from each source	812	1309	793	713	1191
4. Percentage of composite list in each source with frequency of 1	40	40	40	30	50
5. Percentage of important list in each source with frequency of 1	40	20	20	20	20
6. Percentage of composite list with total frequency in one source	15	50	25	33	33
7. Percentage of important list with total frequency in one source	0	20	5	5	5

tance in the work of adapting the material of science textbooks to the ability levels of the students for whom they are written.

THE IMPORTANT TERMS

This list of terms is published as an exhibit of the vocabulary which is, by a rather liberal (and objective) definition of the word, rated as important. No word has been included unless it occurs in as many as three sources or unless it occurs with a total frequency of 10 or more. A key has been used to tell the importance of each word. The numeral indicates frequency and the letter indicates range of occurrence as follows:

Frequency	Range of Occurrence
1 = more than 500	a = in 5 sources
2 = 250–499	b = in 4 "
3 = 100–249	c = in 3 "
4 = 50– 99	d = in 2 "
5 = 30– 49	e = in 1 "
6 = 20– 29	
7 = 10– 19	
8 = less than 10	

The most important terms on the basis of range and frequency are evidently those keyed "1a." These occur with a frequency of more than 500 and in all of the five sources. The key "7c," for example, tells that the word is used in three sources and that its total frequency in these three sources is between 10 and 19.

This list is useful to teachers, because the fact that a term occurs in this list is objective evidence that the term is important. It is, consequently, a term the meaning of which the teacher may properly require his students to master, in so far as the meaning has been developed through instruction. The usefulness of the list, as a source from which to get material to be used in tests, is obvious. Textbook writers may know that in using the vocabulary of this list and that of the *Teacher's Word Book* they are doing the usual thing. They will not limit themselves in their writing to these vocabularies, but an author who develops an extensive vocabulary which is not in these lists should understand that he is doing an unusual thing and be prepared to support his action.

IMPORTANT TERMS, COMPILED FROM TEXTBOOKS FOR GENERAL SCIENCE, BIOLOGY, PHYSICS, AND CHEMISTRY, AND FROM OTHER READING MATERIAL FOR SCIENTIFIC SUBJECTS

abbreviate	7a	adductor	7e	albumen	7c	alum	5c
abdominal	6d	adenoid	7e	albumin	7c	alumina	7d
abnormal	5a	adhesion	6b	alchemist	7d	aluminium	6c
abrasive	5d	adhesive	7a	alcoholic	4b	aluminium	
absorption	3a	adjunct	8c	aldehyde	6d	hydroxide	5d
abstainer	7d	adjustable	8b	alga	3c	aluminium	
accelerate	5c	adsorb	6d	alimentary	5d	oxide	5d
acceleration	3b	adsorption	7e	alizarin	7d	aluminium	
accumulation	6b	adulterant	8c	alkali	3b	sulfate	7e
accuracy	6a	adulterate	7d	alkaline	4b	amalgam	7d
acetanilide	7b	adulteration	6d	alkaloid	5c	amalgamate	7c
acetate	7d	adventitious	6e	allantois	7e	ambergris	7d
acetic acid	4b	aerate	7c	allotropic	5e	amino acid	6e
acetone	5c	afferent	7e	alloy	3c	ammeter	4e
acetylene	4c	affinity	6d	alpha	7c	ammonium	4a
acidity	8b	agar agar	6c	alternating-		ammonium	
acidulate	7b	Aggassiz	7e	current	6d	chloride	6c
acreage	8c	aggregate	7a	alternation	5c	ammonium	
adaptability	8b	airship	6c	alternative	8c	hydroxide	6c
adaptation	2d	akene	7e	alternator	5e	ammonium	

nitrate	7c	appendage	3d	ballast	7b	blue-grass	7e
ammonium sulfate	7c	appendix	5b	balsam	7d	bobwhite	7d
amnion	7e	applicable	8c	barb	7d	boll	7d
amoeba	3d	appreciable	5a	barberry	6e	bombardment	7b
amorphous	5d	aqua regia	7d	barium	6b	boneblack	7e
ampere	3c	aquatic	5c	barium chloride	7e	Bordeaux	7d
amphibian	4d	aqueduct	7d	barometer	3b	boron	6c
amplification	7d	aqueous	7c	barometric	6c	botanist	6c
amplifier	7d	arabic	8c	basic	4d	botany	8b
amplitude	7c	Arachnida	7e	basswood	7d	bowlder	7c
amyl	7e	arc	3a	bast	5c	Boyle	5c
amylopsin	7e	archegonium	5e	batch	7c	breeder	5d
anaesthetic	5b	Archimedes	5d	bauxite	7d	brilliance	6b
analogous	5b	argon	5b	beaker	5b	broadcast	7b
analogy	6b	arid	7b	beehive	7d	bromide	5c
analyze	5a	armature	3c	beneficial	4c	bromine	3b
anatomy	6b	armistice	8c	benzene	5d	bronchus	5c
ancestral	7e	aroma	5c	benzoate	8c	Brownian	7d
ancestry	7b	arrowhead	7c	benzol	6c	brownish	7b
anemone	6e	arsenic	4b	beriberi	8c	bryophyte	7e
aneroid	6d	artery	3c	Bessemer	5d	bubonic	7d
angiosperm	6e	arthropod	4d	beta	8c	bulge	7c
angular	8b	asbestos	5b	beverage	4b	bumblebee	7d
anhydride	6d	asexual	5e	bicarbonate	7d	Bunsen	4b
anhydrous	7d	asphyxiate	7b	bichloride	7c	buoy	7a
aniline	4a	assimilate	4c	biennial	7e	buoyancy	7b
anneal	8c	assumption	7b	bile	5c	buoyant	7c
annelid	7e	astronomer	5c	billiard	7d	Burbank	5d
anode	3c	astronomic	7c	billion	6a	burdock	6e
Anopheles	6d	atmospheric	4a	binary	7d	burrow	5d
Antares	7d	atomic	3b	binocular	7d	by-product	3c
antenna	3b	atomizer	8b	biologic	4c	cactus	7e
anterior	4d	attainable	8b	biologist	5d	caddis	7c
anther	4d	Atwater	7d	biology	3b	cadmium	7d
antheridium	6e	auditory	7d	bipolar	7e	caffeine	6b
anthracene	7d	Audubon	5e	bismuth	5b	caisson	7c
antibody	7c	auricle	3e	bison	7e	calcium	3a
antidote	8c	Avogadro	6e	bisufid	7d	calcium carbide	5c
antimony	5b	axial	6e	bittern	8c	calcium carbonate	4b
antitoxin	4c	axon	7e	bituminous	6c	calcium chloride	5d
aorta	6d	bacillus	3c	bivalent	6c	calcium cyanamide	7d
aortic	7e	bacteriologist	6b	bivalve	5e		
aphid	4d	bacteriology	6c	blastula	7e		
		bacterium	1b	blowpipe	5b		

calcium hydroxide	4e	catalytic	4d	churn	8b	complex	3a
calcium oxide	7d	catyalyzer	7d	cicada	7d	component	4a
calcium phosphate	7d	catbird	7b	cilia	4a	composite	7b
calcium sulfate	7d	cathode	3c	ciliate	7e	compressible	7c
calibrate	7e	catkin	7c	circulatory	4c	compression	4b
calorie	2a	caudal	7e	citric acid	8c	compressor	7b
calorific	7d	cavity	3b	civet	7e	compulsory	7d
calorimeter	6b	cellular	7c	classification	4c	computation	7d
calyx	4d	cellulose	3b	cleanliness	5c	compute	3b
cambrium	4c	centigrade	3a	click	7c	concave	3a
cancer	6a	centimeter	2a	climatic	7c	conceivable	8b
candle-power	6d	centipede	6d	clinic	8c	concentration	5b
canine	6c	centrifuge	5a	cloaca	7e	concentric	7c
caoutchouc	6e	cephalopod	7e	clockwise	7c	concise	8c
capillarity	5b	cephalothorax	7e	clot	6c	conclusive	7b
capillary	3b	cerebellum	5e	coagulate	5b	condensation	4b
capita	8b	cerebral	7e	coal tar	4d	condenser	3b
caprifig	7e	cerebrum	5e	cobalt	4a	conduction	5c
capsule	4b	cerium	6d	cocaine	6b	conductive	7d
carapace	7e	cesspool	7d	cochlea	6d	conductivity	5c
carat	7d	char	6a	cocklebur	7d	congestion	7d
carbide	6c	chemist	2a	cockroach	7e	conical	7a
carbohydrate	2b	chickadee	7d	codlin	7e	conifer	6d
carbolic acid	7c	Chilean	7e	codling	6d	conjugate	7d
carbonate	3b	chimpanzee	7d	coefficient	3c	connective	6e
carbon dioxide	1b	chipmunk	5d	Coelenterates	6e	consecutive	8b
carbon disulfide	4d	Chittenden	7e	cogwheel	6d	conservation	4a
carbonic acid	7c	chloride	5d	cohesion	7d	consistency	7b
carboniferous	7c	chlorine	2a	cohesive	7d	constellation	6d
carbonization	7e	chloroform	5c	coincide	7d	constipation	7d
carbon monoxide	4b	chlorophyll	3b	coke	2b	constituent	3a
carbon tetrachloride	7d	chloropicrin	7d	collective	7c	consumptive	7c
carborundum	4c	chloroplast	5d	collodion	5d	contaminate	5b
Carnivora	6e	cholera	6c	colloid	4c	contamination	6b
carnivorous	6c	chorion	7d	colloidal	3d	continuity	8c
carpel	7e	choroid	7e	coloration	6d	contractile	7e
carpellate	6e	chromate	7e	colorless	3c	contraction	4a
cartilage	5d	chrome	7d	combustible	5a	contrivance	8c
casein	5b	chromatin	7d	combustion	3a	convection	4d
catalyst	5d	chromic	7c	communal	7e	converge	5c
		chromium	4c	communicable	6c	conversion	6c
		chromosome	3d	commutator	5c	converter	6e
		chronic	7c	competitor	8b	convex	3a
		chrysalis	7d	complementary	7c	coon	7e

coordinate	7d	cumulative	8c	devise	4a	distributor	8b
copious	8b	cupric	7d	dextrin	5c	diverge	5a
copper oxide	5d	curative	7c	dextrose	5d	dodder	7e
copper sulfate	4b	Curie	6c	diabetes	4c	domesticate	3c
copra	7e	curvature	4c	diagrammatic	7a	domestication	4d
copyright	7b	cuticle	7d	diaphragm	3a	dominance	7e
cordite	7d	cutworm	7d	diarrhea	8c	dominant	4c
cornea	7d	cyanamide	6a	diastase	6c	dormant	6c
cornstarch	8b	cyanide	7c	dicotyledon	6e	dorsal	4e
corolla	4d	cyclone	5d	dicotyledonous	6e	dredge	8c
corpuscle	3a	cylindrical	5c	dichromate	7d	drone	6d
corrode	7c	cyst	7d	Diesel	7d	droplet	7b
corrosion	6d	cytoplasm	7e	dietary	5c	drupe	7e
corrosive	7d	dahlia	7e	differential	6c	dryness	8b
corrosive sublimate	8c	Dalton	5d	differentiate	7c	duct	3b
cortex	4d	damper	6c	diffusion	4b	ductile	7d
corundum	7d	Daniel	7e	digestible	6b	ductility	7c
cotton-seed	4b	Darwin	4c	digestibility	7c	durability	8b
cottonwood	7d	Davy	6c	digestion	3b	dyestuff	4b
cotyledon	3e	deciduous	7d	digestive	2b	dynamo	3a
counteract	7a	declination	7e	dilution	7d	dyne	5d
counterbalance	8c	decompose	3a	dioxide	2b	dysentery	7d
counter clockwise	7d	decomposition	3b	diphtheria	3c	earthworm	3d
cowbird	6d	deflect	6c	Diptera	7d	ebonite	7d
cowpox	7d	deflection	4c	direct-current	5d	ectoderm	6e
cranium	7d	dehiscent	7e	dirigible	7b	edible	4b
crayfish	4e	dehydrate	7d	disadvantage	5a	Edison	5b
cresol	8c	deliquescent	6d	discomfort	6b	effectiveness	7b
crocodile	6d	denature	7b	discontinuous	7c	efferent	7e
crossbreed	7d	density	3a	discoverer	7b	effloresce	7d
cross-pollinate	7e	dentine	7d	discriminate	7c	egg cell	6e
cross-pollination	4d	deoxygenate	7e	disinfectant	5b	eggshell	7b
crucible	5c	deplete	8c	disinfection	7e	eject	7c
Crustacea	5e	depression	6a	disintegrate	6a	elasticity	6b
crustacean	5e	derivative	6d	disintegration	6a	electrification	6e
cryolite	7d	dermis	6e	dispersal	4c	electrify	4b
crystallization	5c	derrick	8c	dispersion	6c	electro-chemistry	5c
crystallize	4b	descriptive	8c	displacement	4a	electrode	3b
crystalloid	8c	detection	8c	dissimilar	8b	electrolysis	3c
cubic	2a	deteriorate	7c	dissociate	5d	electrolyte	4c
culex	6c	detriment	7b	dissociation	7d	electrolytic	4c
		devastate	8c	distillate	7c	electromagnet	3a
		developer	6c	distillation	3a	electromotive	4c
		deviate	7b	distinctive	7a		

electron	3b	ether	3a	ferric oxide	7d	fumigate	7d
electrophorous	7e	ethyl	4c	ferrous	7c	fungicide	7d
electroplate	7c	ethyl alcohol	7e	ferrous sulfate	7d	fungus	3b
electroscope	4d	ethylene	6a	fertilization	3c	fungous	6d
electrostatic	7e	eugenics	8d	fibrin	7d	fusible	7e
elementary	6a	eudiometer	7e	fibrinogen	7e	fusion	5b
eliminate	4a	Euglena	7d	fibrous	5b	fuzzy	7d
elimination	6a	Eustachian	6d	fibrovascular	5e	Galileo	5d
elk	7e	evaporation	3a	filament	3a	galvanic	5d
elliptic	7b	evolve	3a	filings	5c	galvanometer	4c
elongate	5c	excavate	7b	filter	4a	gamete	4e
elongation	8c	excrete	5c	filtration	7b	gametophyte	4e
emanation	7c	excretion	4c	finch	7d	ganglion	4e
embed	7b	excretory	6e	fireless	7d	gaseous	3a
embryo	2c	excurrent	7e	fireworks	8b	gasoline	2a
embryology	6d	exhaustion	7c	fishery	6e	gastric	4b
embryonic	7e	exoskeleton	5e	fission	5e	gastropod	7d
emission	7c	experimental	4a	fixation	5c	gastrula	7e
empirical	7c	experimentation	7b	flashlight	6a	Gay-Lussac	6d
emulsify	4b	experimenter	7a	flora	7c	gel	7e
encircle	7c	expiration	7e	fluctuate	6b	gelatinous	8c
encyst	7e	explode	5a	fluke	7e	generalization	7c
endosperm	4e	explosive	3a	fluorescence	7e	generate	3a
energesis	7e	exterminate	5c	fluoride	7c	generator	3b
energize	7e	extermination	6e	flux	5c	genetics	7d
engulf	7c	extraction	6c	flywheel	5d	genus	5d
entomologist	7d	eyepiece	5d	focal	4d	geographic	7d
entomology	7d	facet	7d	focus	3a	geologic	6a
enumerate	7c	facilitate	7a	follicle	7d	geologist	7b
environment	3d	Fahrenheit	4a	foot-pound	7d	geology	7b
enzyme	4b	fallacy	8b	forestry	5c	geometric	7c
epidermis	3d	Faraday	6c	formaldehyde	4b	geotropism	6e
epiglottis	7d	fatty	5b	formalin	6b	geranium	5d
epithelium	7e	feebleminded	7e	formic acid	7d	germicide	6b
equatize	8b	Fehling	6d	formula	2a	germinate	3b
equation	2c	feldspar	6c	formulate	7a	germination	4d
equilibrium	3b	femur	7e	fossil	4b	glacial	7c
equilibrant	7e	ferment	4b	fractional	6b	glaze	6d
erg	6e	fermentation	4b	Fraunhofer	7e	globule	7b
erosion	5c	ferric	5c	frequency	4a	glucose	3c
esophagus	5e	ferric chloride	7d	friction	2b	gluten	6b
ester	5c	ferric hydroxide	7e	frond	7e	glycerin	5a
etch	6c			frontispiece	8c	glycerol	6d
ethane	8d			fulcrum	3c	glycogen	6d

goldenrod 5d
goldfinch 7d
gopher 8c
gorilla 7d
gout 8c
gram 1a
gram-molecular 5e
granule 5a
graphic 7a
gravitation 5a
grid 5d
grippe 8c
grouse 6d
guano 7c
Guiana 7d
gullet 4d
guncotton 6d
Gymnosperm 5e
gypsum 6c
Haber 7d
habitat 7d
haemoglobin 5b
halogen 5d
handicap 7d
haphazard 8b
hardwood 6d
harmful 3c
hatchery 7e
haunt 7d
hay fever 8c
headwater 8c
heliotropism 7e
helium 4b
helix 7e
Helmholtz 7e
hematite 7e
hemp 6c
herbivorous 8c
heredity 4c
Hereford 7d
heron 7e
hexagon 8b
hexane 8d
hibernate 7c
high tension 7d
hilum 5d
hippopotamus 7e
honeybee 5c
honeydew 7d
hookworm 6e
hormone 6d
horse-chestnut 7c
horsepower 4b
horsetail 7e
house fly 7d
humid 8b
humidify 8c
humidity 3a
hump 8c
humus 5b
hybrid 3c
hybridization 6d
hybridize 6e
hydra 3e
hydrant 7d
hydrate 5b
hydraulic 4c
hydriodic acid 7e
hydrochloric 6c
hydrochloric acid 3a
hydrobromic acid 7e
hydrocarbon 4d
hydrocyanic acid 8c
hydroelectric 8c
hydrofluoric acid 6d
hydrogen 1a
hydrogenation 7d
hydrogen bromide 7e
hydrogen chloride 3d
hydrogen fluoride 7e
hydrogen peroxide 5c
hydrogen sulfate 7e
hydrogen sulfide 4d
hydroid 6e
hydrolysis 6d
hydrotropism 7e
hydroxide 4d
hydrostatic 7e
hydroxyl 5e
hygiene 4c
hygienic 4b
hymenopterous 7d
hypha 7e
hypo 7d
hypocotyl 4e
hypothesis 4c
ichneumon 5e
identical 5a
identity 7b
ignite 4b
ignition 5b
illuminant 7c
illumination 4b
imaginary 8c
imbed 7d
immature 7e
immerse 4a
immune 6c
impact 7c
impede 8c
impervious 8b
impinge 8c
impracticable 8b
impregnate 6b
imprint 8c
improbable 8c
improper 7d
impurity 3a
inaccurate 8c
inactive 6b
inadequate 7c
incandescent 3b
incendiary 8b
incidence 6c
incipient 8c
incision 8c
incisor 6c
inconspicuous 7c
incorrect 8c
incubation 7d
indehiscent 7e
indicator 7c
indigestible 6d
indigestion 5b
indistinguishable 8c
induction 3c
inductive 7e
ineffective 8c
inefficiency 8c
inert 5b
inertia 5c
inference 8c
inflammable 6b
inflate 6a
influenza 6c
infrequent 8a
infusible 7d
Infusoria 7d
ingenuity 8c
ingot 7d
inhalation 8c
inhale 6a
inherent 8b
inhibit 7d
inject 4b
inoculate 4b
inorganic 4b
input 5c
insanity 7d
Insecta 7e
insecticide 7c
insensitive 8c
insoluble 3a
installation 7b

instantaneous	7b	joule	5e	limestone	4b	mammoth	7c
insulation	7a	juggler	7e	lime sulphur	7d	mandible	4d
insulin	4e	jute	7d	limewater	6b	manganese	3a
intact	8c	kaolin	7b	limitation	8a	manganese dioxide	4c
intake	6b	katydid	7d	linear	7e	manipulation	8b
integument	7e	Kellogg	5d	lipoid	7e	manometer	7e
intensify	5c	kelp	7c	liquefaction	7c	margarin	6e
intensity	4a	kg.	4d	liquefy	4b	masticate	8c
intensive	7d	kiln	5c	liter	2a	mastication	5d
interaction	7b	kilowatt	4c	literal	7b	mathematician	7c
interchangeable	8c	kinetic	3b	litharge	7d	matte	7e
interdependence	7e	kingbird	7d	lithium	7d	maxilla	5e
interference	5c	kingfisher	7d	litmus	4b	mazda	7d
interlock	7c	krypton	7d	liverwort	7e	measles	6d
intermediate	5b	labium	6e	lobe	4d	measurable	7e
intermingle	8b	labrum	6e	localize	8c	mechanism	4a
intermittent	7b	lacquer	6c	lockjaw	7c	media	7b
interrelation	8c	lacteal	5e	locomotion	3d	medicinal	6b
intersperse	8c	lactose	7d	lodestone	7c	medulla	6e
intestinal	4c	lady's-slipper	7c	lodgement	7c	medullary	7d
introductory	8b	Lamarck	7d	logical	8c	medusa	7e
invaluable	8c	laminate	7d	longitudinal	4b	megaspore	7e
inverse	5b	lampblack	6b	lubrication	7c	membrane	3a
invertebrate	6d	larch	7e	lye	7b	membraneous	7e
investigator	6c	larva	2c	lymph	3c	Mendel	5c
iodide	6d	larynx	7d	macaroni	7c	Mendelejeff	6d
ion	2c	latent	7b	macronucleus	7e	menu	8c
ionization	5e	lateral	5c	Magdelburg	7e	mercurial	7c
ionize	5d	latex	7d	maggot	5d	mercuric chloride	7d
ionone	7d	lavendar	8c	magnesium	3a	mercuric oxide	6e
iridescent	7b	Lavoisier	6d	magnesium chloride	7d	mercurous chloride	7d
iridium	8c	leaflet	6e	magnesium sulfate	7d	merge	8c
iron carbide	6d	legume	5d	magnetic	2a	mesentery	7e
iron oxide	5b	leguminous	8c	magnetism	4b	mesoderm	7e
irregularity	7b	lengthwise	6a	magnetite	7c	mesothorax	7e
irritability	7e	lenticel	7d	magnetize	4c	metallic	3b
irritate	5b	Lepidoptera	6e	magnification	7c	metallurgist	6e
isolate	4a	leverage	8c	malaria	3c	metallurgy	5d
isoprene	7e	levulose	7e	mallard	7e	metamorphosis	3d
jackscrew	6e	Leyden	5e	malleable	5c	metazoan	7e
jasmine	7e	liberate	3a	maltose	7c	Metchnikoff	7d
Javelle	6b	lichen	5c	mammal	3b		
jellyfish	6e	ligament	7e				
Jimson weed	7e	lignite	8b				

meteorite	8c	muggy	8c	nutriment	8c	oxidation	2b
meteorology	8c	much	7d	nutrition	4b	oxide	2b
methane	5d	mullein	7d	nutritive	5b	oxidize	2a
methyl	5c	multiple	4b	objective	7c	oxyacetylene	7d
methyl alcohol	7e	munitions	7d	oblong	8b	oxygen	1a
metric	5c	mutation	6e	observatory	7c	oxyhydrogen	7e
microbe	6e	mycelium	7e	occurrence	4b	ozone	5d
micronucleus	7e	Myriapoda	7e	octave	5c	palatable	7b
microorganism	6c	naphtha	6b	octopus	7d	paleontology	7e
microphone	6e	naphthalene	6b	Oersted	7d	palisade	5d
micropyle	5e	narcissus	8c	ohm	3d	palmate	7e
microscope	3a	narcotic	5c	oleic acid	7e	palmitric acid	7e
microscopic	4b	nascent	6d	olein	6c	palmitin	7c
mid-brain	7e	nasturtium	6d	oleo	7e	palpus	7e
midrib	7e	naturalist	7d	oleomargarine	6b	pancreas	4d
migrate	4c	nausea	8c	omission	8b	pancreatic	5c
migratory	7d	necessitate	8b	opaque	6a	papilla	7e
mil	6e	negligible	7b	open-hearth	6d	parachute	7c
mildew	6b	neon	7c	operator	8c	paradox	8c
milligram	7c	neutralization	5c	operculum	6e	parallelogram	5e
millimeter	4b	neutralize	4a	opium	5c	paralyze	7c
mimicry	7d	newt	7d	opsonin	7e	Paramecium	4e
mink	5d	nickel-plate	7b	optional	7e	parasite	3c
modification	4a	nicotine	6b	orchid	6d	parasitic	3b
molar	6c	niter	7c	organic	2a	parasitism	7e
molecular	3a	nitrate	3a	organism	2b	parenchyma	7e
molecule	1a	nitric acid	3d	orifice	8c	parsnip	6c
Mollusca	6e	nitric oxide	5d	Orion	7d	Pascal	6d
mollusc	5e	nitrocellulose	5d	Orthoptera	7e	Pasteur	5b
molt	5e	nitrogen	2a	oscillate	7d	pasteurization	7d
molybdenum	7c	nitrogen-fixing	7b	oscillation	4d	pasteurize	6c
momentum	5c	nitrogenous	4c	oscillatory	7e	peat	6b
monocotyledon	6e	nitrogen peroxide	6e	osmosis	3d	pectoral	6e
monocotyledonous	5e	nitroglycerin	5d	otter	7d	pedicel	7e
monopoly	7d	nitrous acid	7e	output	4b	pellet	8b
monoxide	7c	nitrous oxide	6c	ovary	3c	pelvic	6e
moose	7d	node	5d	overlap	6b	pendulum	3b
mordant	6d	nodule	7c	overtone	4d	pentane	8c
morphine	6b	notochord	7e	oviduct	7e	peppermint	7d
mosaic	7d	nucleus	3a	ovipositor	7e	peptone	6e
moult	7d	nuisance	6b	ovoid	7e	perceptible	7a
mucilage	8c	numerical	6c	ovule	4d	percussion	8c
mucous	5c	nutrient	3b	oxalate	8c	perforate	6a
				oxalic acid	7e	pericarp	7e

periodic	5c	pith	4c	prefix	7d	pulverize	7a
periphery	8c	placenta	7e	prehension	7e	puncture	8c
periscope	7e	plantain	6d	prehistoric	6b	pungent	7c
perishable	8c	plantlet	8c	premise	7e	pupa	3c
permanganate	7d	plasma	4d	premolar	7e	pupate	7d
permeable	8c	Plasmodium	7e	prevalent	6c	purification	4a
persistence	8c	plastic	5c	preventable	7d	putrefaction	8c
petiole	5d	Pleurococcus	6e	prevention	5b	putrefy	8c
petri	7d	plumule	4e	preventive	7c	pyrex	8c
pharynx	5e	plunger	7d	Priestley	7c	pyrite	7c
phenol	5d	pointer	6c	primate	5d	pyroxylin	7d
phenolic	7e	polarization	7e	prism	4b	qualitative	8c
phenomenon	3a	polarize	8c	prismatic	7c	quantitative	7c
phenyl-ethyl-alcohol	7e	pollinate	5e	proboscis	6d	quarantine	4c
		pollination	3d	procedure	7b	quartz	5b
phloem	6e	pollution	7c	productive	7b	quicklime	7d
phoebe	7d	polyp	6e	proglottid	7e	rabies	7e
phonograph	6b	pome	7e	prohibitive	8c	raccoon	7d
phosgene	7d	porcupine	7d	projectile	5c	raceme	7e
phosphoric acid	7c	porous	4a	projection	5b	radial	6d
phosphorous oxide	8c	poster	7d	prolific	8c	radiate	5b
		posterior	4d	prominence	8c	radiation	3a
photographic	4a	potassium bromide	7e	prong	5e	radioactive	5c
photography	4b	potassium chlorate	4b	propagation	4b	radioactivity	5d
photometric	6e	potassium ferricyanide	7e	propolis	7e	radium	3b
photomicrograph	8c	potassium hydroxide	5e	propel	6b	rancidity	7e
		potassium iodide	7c	propeller	5a	rapidity	5a
photosynthesis	4d	potassium nitrate	5c	proportionate	7c	rarefaction	6e
photosynthetic	7e	potassium permanganate	7c	protective	4b	ratio	3a
phototropism	6e	potential	3b	proteid	3d	ration	6c
phylum	5d	pottery	7c	protein	1b	react	3b
physicist	5b	practicable	7a	prothallium	7e	reagent	6d
physiologic	5c	precipitate	3a	protonema	7e	realization	8b
physiologist	7b	precipitin	7e	protoplasm	2b	recession	8c
physiology	7b	precipitation	5a	protoplasmic	7d	reclamation	7d
picric acid	7d	precision	7b	Protozoa	3c	rectum	7d
pigment	3b	preferable	7a	protractor	8c	refinery	7c
pigweed	7e	prefix	7d	protrude	7c	reflector	6d
pinnate	7d	prehension	7e	pseudopod	5d	reflex	4d
pipit	8c	prehistoric	6b	psychology	7c	refract	5b
Pisa	7d	premise	7e	ptomaine	7d	refraction	3a
pistil	3d	premolar	7e	ptyalin	7d	refractory	7e
pistillate	5c	prevalent	6c	pulmonary	5d	refrigerate	8c
pitchblende	7c	preventable	7d	pulsation	7c	refrigeration	6a

regenerate	6d	runway	8b	shad	6d	solidification	7c
regularity	8c	rupture	8b	shale	7b	solidity	8c
regulator	8c	sac	4c	shellfish	7c	solubility	4d
regurgitate	7d	saccharin	7d	short-circuit	8c	soluble	3a
rennet	8c	saccharose	7c	shrimp	7d	solute	6e
rennin	7e	salamander	5d	shrinkage	8b	Solway	6d
replacement	5c	sal ammoniac	7c	shunt	5b	sorus	7e
reproduce	3b	salicylic acid	7c	significance	6a	spawn	4d
reproduction	3b	saline	8c	silica	3c	specialization	6d
reproductive	5d	saliva	4c	silicate	4d	specialize	4d
repulsion	6d	salivary	5c	silicic acid	7e	specific	2a
reputable	8c	saltpeter	5c	silicon	4b	specification	7c
requisite	8c	sandstone	7b	silicon dioxide	5e	spectra	6c
residual	7c	sanitation	6c	silt	7c	spectroscope	5b
resin	4a	saponify	8c	silver bromide	6c	spectrum	3a
resinous	7b	sapwood	7d	silver chloride	5d	sperm	3b
resistant	5b	satellite	8c	silver nitrate	5c	spermary	7e
resonance	5d	saturate	3a	simplify	7b	spherical	4b
resonator	6e	saturation	7c	siphon	4a	spicule	7e
respirator	7d	scarcity	7b	Sirius	8c	spiracle	6e
respiratory	5c	scarlet fever	7e	skid	7d	spirillum	7e
restorative	8c	scavenger	5d	skunk	6d	Spirogyra	4e
resultant	4c	scientist	3a	slag	4d	splint	8c
retard	5a	scion	7e	slake	5e	sporangium	6e
retardation	8c	scutellum	7e	slit	5b	spore	2b
retention	8c	sea anemone	7e	sludge	8e	sporophyll	7e
retina	3c	secrete	4b	smallpox	4c	Sporophyte	4e
reverberatory	7e	secretion	4c	smut	6c	spurt	8b
reversible	6d	sedentary	7d	sodium	2a	sputum	7c
revolutionize	7b	seedling	3c	sodium bicarbonate	5d	squid	7e
rheostat	7e	segment	3a	sodium carbonate	4c	squirt	7d
rhinoceros	7e	segregation	7d	sodium chloride	4c	stability	6b
rhizoid	7e	selective	7c	sodium cyanide	7d	stabilize	8c
rhombic	7e	selenium	7d	sodium hydroxide	3c	stagnant	7b
rhubarb	7b	semicircular	6c	sodium nitrate	4c	stamen	3c
rickets	7d	sensitize	7b	sodium peroxide	7c	staminate	6c
rigidity	8c	sensory	6e	sodium sulfate	6d	standardize	7c
rodent	5d	sepal	4c	sol	7e	standpipe	6d
root-hair	5d	sequence	7c	solar	5a	standpoint	5a
rootlet	6c	Sequoia	7e			starfish	4e
rotate	3a	serum	5d			static	5d
rotation	4a	seta	6e			stearic	7d
rotor	6e	sewage	4b			stearic acid	7e
routine	8c	sexual	4d			stearin	5c

step-up	7d	swimmeret	7e	torque	7d	utilize	3a
sterilization	7b	symbiosis	7e	torricelli	7d	vaccinate	7d
sterilize	4a	synthesis	4b	toxic	7e	vaccination	4d
sternum	7e	synthetic	4d	toxin	5c	vaccine	7d
stigma	3d	systematic	5c	trachea	4d	vacua	7e
stimulant	5c	tabular	8c	tractor	8c	vacuole	4d
stimulate	4b	tabulate	8c	trait	7c	valence	3d
stimulation	5e	tachina fly	7e	transatlantic	8c	vanillin	7d
stimulus	3c	tactile	7d	transference	7c	vaporization	6c
stoma	4d	tangent	6c	transformation	4a	vaporize	4a
stomata	4e	tannin	7c	transition	7b	variant	8c
stopcock	7b	tapeworm	5d	translucent	7a	vaseline	7a
stratum	7c	tapioca	8c	transmitter	6c	vascular	5e
strobilus	7e	technic	5a	transparency	8c	vegetarian	6d
strontium	7c	telegraphy	5b	transpiration	4b	vegetative	6d
strychnine	7c	telephony	6c	transverse	6d	velocity	2b
stupefy	8c	tenacious	8c	triangular	8b	ventilation	3a
subclavian	7e	tenacity	8c	trichina	6e	ventral	4e
subdivide	7b	tendon	6e	trillion	8c	ventricle	4d
submarine	4a	tendril	6d	tripod	8b	vertebra	6e
submerge	5b	tentacle	4e	trypsin	7e	vertebrate	3d
substitution	7b	ternary	7e	tuber	6b	vestibule	7e
sucrose	6c	tervalent	7e	tubercle	6c	vestige	7d
suction	5b	testa	6e	tubular	6c	vibration	2a
suet	7c	tetanus	7d	tungsten	4b	vibrator	8c
suffocate	6b	Thalessa	7e	turbine	4c	vice versa	7a
sulfate	3a	Thallophyte	7e	tussock	7d	villus	5e
sulfide	3c	thallus	7e	tympanic	7e	vireo	6d
sulfite	6c	therapeutic	7d	tympanum	7d	virus	7d
sulfur dioxide	3c	thermal	7c	ultra-violet	7c	viscera	7d
sulfuric	4c	thermit	7d	umbel	7e	viscose	7d
sulfuric acid	2a	thermometry	7e	undue	7b	viscosity	8c
sulfurous acid	6d	thermos	7b	undulate	8c	viscous	8c
sulfur trioxide	6e	thoracic	7e	ungulate	6e	visual	7c
sumac	7e	thorax	4c	univalent	6c	vitality	7c
summarize	6b	thorium	5c	upstroke	7d	vitamin	4b
superheat	8c	thyroid	7c	uranium	4c	vitriol	5c
supersaturate	7d	tibia	7e	urea	5b	volatile	4a
supersede	8b	tidal	7d	ureter	7e	volatilize	7d
supervise	8c	tinfoil	8c	uric acid	8c	volcanic	8c
supplement	5c	titanium	7d	urine	5c	voltage	3b
survival	7c	toluene	7d	usable	8c	voltaic	7c
susceptible	7c	tonsil	7d	user	8c	voltmeter	4d
suspension	5b	tornado	7d	utilization	6b	Volvox	7e

vulcanize	7c	wet-bulb	7d	X-ray	4b	zinc oxide	6d
warbler	7e	whisky	6c	xylem	6e	zinc sulfate	6d
wart	7d	windpipe	7d	yellow fever	7c	zinc sulfide	6d
watershed	8c	woodcock	7d	Yerkes	7c	zoology	7d
watt hour	7d	wriggler	7d	zebu	7d	zoospore	7e
weevil	5d	xenon	7d	zeppelin	8c	zygospore	7e
westerly	7e	xerophyte	7e	zinc chloride	6d	zygote	7e

SCIENCE IN THE HORACE MANN ELEMENTARY SCHOOL

By GERALD S. CRAIG

Associate in Natural Science, Teachers College, and Instructor in Science, Horace Mann Elementary School

IT IS not difficult to find some of the causes which have hindered the introduction of science into the elementary schools of this country. It has been difficult to define the specific goals in terms definite enough to offer guidance to curriculum makers. Science covers a large field, and its significance and meaning to man have been growing rapidly. The selection of objectives and goals which should be a part of the elementary school curriculum is a definite problem. The antagonists of science as well as the protagonists realize that the issue is one of great significance. Many of the former permit no opportunity to pass without warning of the dangers which they claim will come as a result of the teaching of science. As a consequence, science has become a much misunderstood subject.

What are the goals for science in the elementary schools? The traditional practice in science teaching is illustrated in the case of nature study. It is not the purpose of this article to go into its history. There may be much in nature study that will stand the acid test of modern and future curriculum technique. Traditional nature study is bound, however, by several weaknesses. First, as defined by many of its authorities, nature study should stop with the mere observation of nature. Scientific generalization, principles, and laws have no place in the elementary school. It is assumed that the level of the upper grades marks a period of great change in the mental ability of children. Presumably children enter this level, which corresponds to the period of the onset of adolescence, with the ability to generalize quite dormant, and they emerge with this ability active. It must be remembered, however, that the point of view of many nature study leaders is a resultant in part of a revolt against the earlier formal class procedure which would have tended to make

nature study a mere memorization of principles. Second, sequence in organization is almost foreign to the traditional nature study. Each teacher is naturally ignorant of what should go before or come after her instruction. Third, the goals of traditional nature study are based on the older conception of the transfer of training. Almost every desirable trait and habit has been promised boys and girls by enthusiasts if they will but study nature.

There are those who would determine the goals for science instruction largely by present practices. To what extent have present practices been determined by careful curriculum construction? Mere compromising of teacher-committees, which seems to be the usual method of constructing courses of study, can never be worthy of wide adoption. Modern curriculum technique of any sort has scarcely scratched the surface of elementary school science. Courses of study are still bound largely by the traditional point of view. Quite frequently they are written by specialists, such as naturalists or agriculturists, who have little knowledge of educational science. Analyses of courses of study in science may reveal where we are but should not be expected to tell us where we should go.

Another group of individuals would leave the selection of objectives entirely in the hands of the teacher and the children. It must be confessed that the teacher has probably been largely the selective agent in this country in the past, and this may account in part for the pathetic state of science in the elementary schools. Some of the great values to be derived from science which society needs to have presented and clarified in the elementary school will not be realized with the average teacher,—whose training has been little more than one course of high school science and whose day is filled with many duties connected with the academic subjects,—alone responsible for selection of objectives. There is no attempt here to take issue on the question as to the liberty of the teacher to select curriculum materials, but merely to point to the need of placing at the teacher's disposal the results of curriculum studies. The selection of materials from the host of possible curriculum materials is a crucial problem in science.

The point of view presented in the following paragraphs is the one operating in the construction of the course of study in science for Grades I to VI of the Horace Mann School.

In the elementary school science of Horace Mann School we are not concerned so much in starting boys and girls on the road to becoming scientists and naturalists as we are in training them to become educated laymen. As laymen they have need of certain skills, appreciations, attitudes, and information that can be secured from science. These represent the nucleus or core material. The teacher, however, need not limit the instruction in science to this core material. In determining objectives, it is not always possible to isolate those which fall properly in the elementary school and those which belong to the secondary school. Many objectives are initiated in the elementary school which should have continuity in the high school.

A. SELECTION OF CURRICULUM MATERIALS: FUNDAMENTAL CONCEPTIONS, GENERALIZATIONS, ETC.

There are great conceptions or generalizations in science that are so important that intelligent people should not be ignorant of them. It will be recognized that the realization of the truth of some of these by man has sometimes changed his horizon and point of view. They may be described as (1) those which, when understood, greatly influence the thought reaction of the individual; (2) those which have modified the thinking in many fields; (3) those which are necessary to the intelligent living of the layman.

A partial list of such conceptions, or generalizations, some of which may be found to qualify under one or more of the above criteria, is submitted below.

1. The universe, including the earth, is very old.
2. The earth's surface has not always had its present appearance and is constantly changing.
3. Space is vast.
4. The shape of the earth is approximately a sphere.
5. Scientists explain the formation of the earth as due to natural processes working through long periods of time.
6. The earth's position and movement relative to the sun has great influence upon the life of the earth.
7. The sun is the source of energy and light for the earth.
8. Matter and energy cannot be created or destroyed.
9. All life has evolved from very simple forms.
10. Species have survived because by adaptations and adjustments they have become fitted to the conditions under which they must live.

11. Physical environment has great influence not only upon the structural form of life but upon society.
12. There is a balance in nature.
13. Some forms of life are minute.
14. Present conditions are apt to persist a very long time on the earth. No catastrophe is likely to occur for the entire earth for immense periods of time.
15. Man has become a determining factor of the environment of plants and animals.
16. Man has ability to control his environment through the knowledge of scientific principles.
17. Man's conception of truth changes.
18. Hypothesis has a function in science.
19. It is desirable to have confidence in the scientific method.
20. Nature's laws are invariable.

It is not contended that all of these can be so presented as to be within the comprehension of children of the elementary schools. The contention is rather that there are some conceptions so important that society can not run risk of omitting them from the curriculum.

There may be more than one way of determining these conceptions. A method used at present at Horace Mann School is to have educated laymen who are not scientists evaluate them by dividing them into five classes as they rank, in their opinion, in importance. There is also the possibility of determining to what extent these generalizations or others occur in current magazines, books, and newspapers of non-technical nature.

Much space has been devoted in educational literature to the value of appreciations and attitudes derived from the study of science and nature study. The emphasis has been placed so largely on appreciations and attitudes that the importance of information as a basis for intelligent understanding has been frequently overlooked. It has become quite common to apologize for having goals in subject matter. Is it necessary to apologize for presenting and clarifying and giving opportunity for experiencing some of these fundamental conceptions derived from science which are so radically influencing modern thought?

Appreciations, attitudes, and the like, are necessarily concomitants of the development of meanings in the information which is presented.

The method of scientific thinking which is used in the accomplishment of these meanings will be illustrated in the teaching, but for the teacher it should be clear that the method is the means and not the end and that the values which result from clarification of method, however important, are concomitant and not primary.

B. SCIENCE NECESSARY TO EFFECTIVE SOCIAL LIFE

There are facts, skills, and habits, such as those relating to health, safety, and economy, which are necessary to effective social life. The reader will find many such items that properly fall in science listed in Harap's *Education and the Consumer*. Below is a tentative list. It will be noted that some of these are important to the individual, while others are needed by society as a whole.

1. The most important fuels, their conservation and efficient utilization for power and heat.
2. The sources and uses of power.
3. The function and utilization of foods.
4. The principles of ventilation.
5. The conversion of mechanical energy into electricity.
6. Disposal of garbage and sewage.
7. The maintenance of soil fertility.
8. Economic value of plants and animals.
9. The major causes of ill-health and the contribution of science to the correction of these causes.
10. Changes in the weather as manifestation of cause and effect.
11. Major causes of accidents and their prevention.
12. Acquaintance with elementary laws of nature which are necessary to the health of the individual and community.
13. Information about appliances which science has developed and which are useful in making for greater comfort and convenience in the home and community.
14. Conservation of natural resources.
15. Purification of water for drinking purposes.

C. ORGANIZATION FOR INSTRUCTION

After the goals of science have been determined, the problem of the best procedure for placing the materials in the course of study presents itself. This problem is similar to others in that there is need of continued research and experimentation.

A study of children's interests will be of considerable assistance in grade placement of the science items.* It is not claimed that this offers the sole criterion. It is possible that children may be interested in materials that are completely foreign to them if they are properly introduced.

Further assistance in securing grade placement is given by an analysis of the fundamental conceptions and generalizations into subsidiary objectives.* Source treatises by authorities in these generalizations are analyzed for underlying concepts. These can be rated by teachers of successful experience as to the grade level at which they believe they can be introduced. A tentative sequence may thus be secured.

An illustration of how fundamental conceptions or generalizations may be analyzed into subsidiary ideas is shown below:

Larger Conceptions

1. Vastness of space.
2. Earth's position and relation to other astronomical bodies.

These break up into a number of subsidiary goals of which the following are a few examples:

1. The earth rotates on its axis, causing day and night.
2. The earth revolves about the sun in one year.
3. The moon presents almost the same face to us all the time since she rotates in the same time that she revolves around the earth.
4. Change of seasons is due to revolution of the earth about the sun and the earth's inclination on its axis.
5. The earth is a very small body when compared with such a body as our sun.
6. The moon is much smaller than our earth.
7. There are other bodies which revolve about our sun.
8. Some of these other bodies, called planets, which revolve about our sun have one or more moons.
9. The earth has but one moon.
10. Some of the planets are many times larger than the earth.
11. The distance from the earth to the sun is ninety-three million miles. The diameter of the earth is only eight thousand miles.
12. The rising and the setting of the sun and stars are the consequence of a daily rotation of our earth upon an axis inclined towards the polar star.
13. Light travels at the astounding velocity of 186,000 miles per second.

* This study is now being carried on at Horace Mann School and will be published during the coming year.

14. Yet some stars are so far away that it takes the light from them many centuries to reach us.
15. The planets and our moon are seen by reflected light, the light originally coming from the sun. The sun is visible because it is a source of light.
16. Stars are other suns, immensely distant, and shine by their own light.

The next phase of the problem is that of experimenting with this material in the classroom. This has been attempted by presenting the material on several grade levels and determining a tentative grade placement by means of stenographic records of lessons together with pre-tests and post-tests.

A tendency in many courses of study in science has been to exhaust the subject in the grade in which it was introduced. This has the weakness that portions of the subject are much too difficult or too easy for that grade. This weakness is remedied at Horace Mann by analysis of the fundamental generalizations into the subordinate concepts. Some of these concepts are elementary and basic to later learning. Instead of teaching the entire subject of astronomical bodies in one grade, the concepts are distributed on a basis of their sequence through several grades, the later concepts being based on an understanding of earlier ones. For instance, the concepts involved in rotation and revolution of the earth are fundamental and must precede the causes of change of seasons.

There is a further tendency to formulate the course of study in terms of objects and things, animate and inanimate. For example, the frog becomes the object of study in the third grade in May, or golden-rod in the fifth grade in September. There has been considerable criticism of science in the elementary school being a mere study of objects. The analysis of larger objectives into component parts avoids this weakness. Tentatively the Horace Mann course is making considerable use of scientific themes which are stated definitely enough to define the instruction. Typical illustrations are the following:

How the care of the parents may help the young to survive.
How plants and animals survive the winter.
We live at the bottom of an ocean of air.
How animals protect themselves against their enemies.
Economic values of plants and animals.
Water—its importance to life.
Community life among animals.

Some of these themes are important enough to occur in more than one grade.

Teacher training institutions have, as a whole, made little or no provision for training their students to teach science in the elementary schools. After graduation from normal school the teacher in service has little opportunity to secure this training. Science must be ignored in the school until teachers have had adequate training for its instruction or provision is made for assistance while teachers are in service. The following types of information for teachers of each grade might prove to be of considerable assistance to them.*

1. Specific objective. A particular goal for the instruction may be stated as follows:

To know some of the ways animals prepare for winter.
To find out some of the ways animals care for their young.
To know there is water in air.
To know our school room is filled with air.
To know we receive heat and light from the sun.
To know some of the ways animals have of protecting themselves.
To know how plants adjust themselves to the cold of winter.

2. Larger aim, generalization, principle or goal of which the specific objective is a part. The teacher cannot be expected to secure the larger aims but she can direct the work toward them. Her part is a necessary one. Most teachers appreciate knowing what the values may be that are beyond their grade. The following is an illustration:

Specific Objective—To know some of the ways in which animals prepare for winter.

The Larger Generalization of which the specific objective is a part—Species have survived because by adaptations and adjustments they have become fitted to the conditions under which they must live.

3. A suggested procedure. Teachers are usually interested in learning of procedures that have been found successful by others.

4. Tests. There is a growing need for tests in elementary school science in order that the efficiency of instruction may be determined.

5. Essential facts, concepts, etc., that are to be developed. Instruction in science is frequently superficial. Even tentative stand-

* The Course of Study in Science in the Horace Mann School, Grades I to VI, which is now in preparation, follows this form of general procedure.

ards of accomplishment have not been established. There is a need for listing what can be expected on the various mental levels. A new term in science work sometimes means little to children because the concept of the term has not been established. The teacher's attention can be focused on the new terms that are necessary to the accomplishment of the objective.

6. Background. Information for the teacher—the teacher needs certain scientific background which deals with the objective to be accomplished. It is surprising to find what a small amount of literature deals in a non-technical style and yet accurately with the common things of nature. The teacher needs information simply but accurately told without the usual sugar-coating of myth and fiction that so many writers feel is necessary to make science interesting. There is a need of divorce between animistic and scientific explanations in the elementary school science.

AN EXPERIMENT WITH MANUSCRIPT WRITING IN THE HORACE MANN SCHOOL

By EDWIN H. REEDER *
Assistant Professor of Education, Teachers College

ENTHUSIASM for manuscript writing in the elementary school seems to be growing steadily. Reports indicate that it is being adopted in an ever-increasing number of schools, and proponents of the system prophesy that it will ultimately be the accepted form of penmanship in our schools.

The Horace Mann School of Teachers College began teaching manuscript writing in 1923, under the direction of Miss Marjorie Wise. An article by Miss Wise describing this type of penmanship, its history and its advantages, appeared in the *Teachers College Record* for January, 1924. In trying out this form of penmanship, the school was consistent with its usual policy of making an effort to test thoroughly innovations in education. It is still too early to draw final conclusions on the subject; the study here presented is one of the attempts which are being made to arrive at a true evaluation of this type of writing.

Since the introduction of manuscript writing into Horace Mann School, the teachers in the lower grades have become more and more convinced of its value for their pupils. Modern psychologists are stressing the value and importance of satisfaction on the part of the learner with the results of his work. Not only does this satisfaction make for the contentment and happiness of the child in his school life, but it also seems actually to expedite learning. In the past little children in their first efforts in penmanship have been able to take little satisfaction in the illegible scrawls which they called writing. The universal testimony of the Horace Mann teachers is to the effect that children learn manuscript writing more easily than cursive and

* Assisted by the following students in Education 233M: Clara Brooks, Fay Banta, Jessie Dunsmore, Miriam MacFadyen, Amelia Fletcher, Fay Griffith, Florence Hall, Josie Kellet, Jessie LeRoux, Fantie Nesbit, Wilhelmina Roeske.

that their first attempts are far more legible and more satisfying both to them and to their teachers.

As a child progresses in his school life toward the upper grades, however, writing becomes less a subject in itself and more a tool for use in other subjects. Naturally, therefore, a child has an increasing need for speed in his penmanship, and the question arose at Horace Mann School as to whether manuscript writing can meet the needs of note-taking and composition writing in the upper grades. Granting that manuscript writing may be valuable in the first three grades, does it fail to meet the needs of higher grades, so that somewhere in their school career children should learn cursive writing?

The purpose of the study which is here reported was to answer this question: Can manuscript writing be speeded up in the fourth and fifth grades so that it equals or approximates the norms which are set for these grades?

For purposes of the study three fifth grades and four fourth grades were used. Of the three fifth grades one was using cursive writing, one manuscript, and the third was composed of children, half of whom were using cursive and half manuscript. In the tables, this class is Class B. In the fourth grade all classes were using manuscript writing. The method of procedure was to request the teachers to spend fifteen minutes per day three days of the week in writing drill. They were to stress speed constantly. On the fourth day one of the students who was working with the experimenter gave a test. In this test four samples of the penmanship of each child were secured. Two of these were at his normal rate of speed, and one at his fastest. In the fourth he ignored speed and paid attention only to quality. The experimenters graded the four samples on the Thorndike Handwriting Scale and counted the letters in each. They then averaged the quality and the speed for each child, and finally the speed and quality for the entire grade.

The experiment was started on January 15 and closed on April 30. The tables appended herewith show the results. They should be read as follows: The first column shows the speed or quality on January 15. The second column shows speed or quality on April 30. The next column indicates the total gain or loss. The fourth column shows how the pupils stood at the beginning of the experimental period with reference to the norm for the grade. The last

column shows how they stood with reference to the norm at the end of the experiment.

The summary at the bottom of the table indicates the findings. It will be noted that both cursive and manuscript writers gained in both speed and quality. The cursive group gained much more than the manuscript group in quality, but much less in speed. This would indicate that efforts to speed up writing were more successful with manuscript groups than with cursive groups. At the beginning of the experiment it will be noted that the manuscript groups were far below the norm in speed, but slightly above it in quality. Contrary to expectations the cursive group were far below in both speed and quality. At the end of the period the cursive group were slightly above the norm in quality, but still very much below the norm in speed. Indeed, they showed but slight gain during the three and one-half months period with reference to the norms. The manuscript group, on the other hand, not only held their place in quality, but also gained slightly. Moreover, in speed they showed a very large gain, being but six letters below the norm at the end of the period. Another way of expressing part of the above is to say that at the end of the period the cursive group were nearly two grades behind in speed, while the manuscript group, two and a half grades behind the norm in January, were less than one grade behind in April.

It will be noted that one group in a fifth grade changed from manuscript to cursive writing. This group consisted of five children; they were asked to change to cursive so that some indication could be found as to what would happen if this change were made. Reference to the tables shows that this group started considerably below the norm in both speed and quality but that in the three and one-half months period they made a large growth. They are still below the norms, but in speed they are but little below the average of the cursive group.

An examination of the results in individual grades is interesting. Class C, for example, started the period above the norm in quality and far below in speed. During the experiment this class fell below the norm in quality, but made a very large gain in speed, beginning over twenty letters below and ending more than one letter above. Class E, starting far below in speed, made a large gain and in addition actually gained in quality.

SPEED TABULATION

FIFTH GRADES

		January Norm 68	April Norm 72	Gain or Loss	January ± Norm	April ± Norm
Cursive	Class A	55.30	58.27	+ 3.97	− 12.70	− 13.73
	Class B	48.10	59.70	+ 11.60	− 19.90	− 12.30
	Class B*	44.50	55.20	+ 10.70	− 23.50	− 16.80
Manuscript	Class C	46.6	73.50	+ 26.90	− 21.40	+ 1.50
	Class B	51.20	60.20	+ 11.00	− 16.80	− 11.80

FOURTH GRADES

		January Norm 59.5	April Norm 66.6	Gain or Loss	January ± Norm	April ± Norm
Manuscript	Class D	31.70	48.50	+ 16.80	− 27.80	− 15.50
	Class E	39.28	58.40	+ 19.12	− 20.22	− 5.60
	Class F	47.29	74.01	+ 26.72	− 12.11	+ 10.01
	Class G	32.00	41.00	+ 9.00	− 27.50	− 23.00

SUMMARY

Average Gains	Manuscript	+ 18.25
	Cursive	+ 8.76
January Standing ± Norm	Manuscript	− 20.97
	Cursive	− 18.70
April Standing ± Norm	Manuscript	− 7.39
	Cursive	− 14.27

* Group which changed from manuscript to cursive.

QUALITY TABULATION

FIFTH GRADES

		January Norm 10.35	April Norm 10.65	Gain or Loss	January ± Norm	April ± Norm
Cursive	Class A	9.00	11.94	+ 2.94	− 1.35	+ 1.29
	Class B	8.90	10.00	+ 1.10	− 1.45	− .65
	Class B*	9.20	10.10	+ .90	− 1.15	− .55
Manuscript	Class C	10.90	9.80	− 1.10	+ .55	− .85
	Class B	10.70	11.20	+ .50	+ .35	+ .55

FOURTH GRADES

		January Norm 9.70	April Norm 10.05	Gain or Loss	January ± Norm	April ± Norm
Manuscript	Class D	10.70	10.90	+ .20	+ 1.00	+ .85
	Class E	10.22	10.80	+ .58	+ .52	+ .75
	Class F	9.41	10.48	+ 1.07	− .29	+ .43
	Class G	10.20	10.50	+ .30	+ .50	+ .45

SUMMARY

Average Gains	Manuscript	+ .26
	Cursive	+ 1.64
January Standing, ± Norm	Manuscript	+ .44
	Cursive	− 1.32
April Standing, ±Norm	Manuscript	+ .36
	Cursive	+ .03

* Group which changed from manuscript to cursive.

Of course the data secured in this study are insufficient for final conclusions. But they seem to show that it is entirely possible, without undue stress, to teach children to speed up manuscript writing to the point of efficiency necessary in the fifth grade.

Much experimentation on manuscript writing is necessary. The results of this study should be verified by other studies and the work should be carried into the sixth grade. Studies of individual cases of unusually fast or unusually slow writers should be made to determine what factors condition success or failure in this sort of penmanship. The amounts of fatigue occasioned by manuscript writing as compared with cursive writing need investigation. Finally, the question of the extent of the difficulty of changing from manuscript to cursive penmanship needs far more experimentation than was applied in this study.

ADMINISTRATIVE AND ACCOUNTING CONTROL OF INCOME IN LOCAL SCHOOL SYSTEMS

By N. L. ENGELHARDT
Professor of Education, Teachers College, Columbia University
AND FRED ENGELHARDT
Professor of Education, University of Minnesota

THE efficient administration of a local school system requires the most careful conservation of all resources of the school district. Careless management in the collection, borrowing, or accounting for income may result in costs which are as unwarranted and unjustifiable as uneconomical expenditures. The income program and the spending program are conditioned one by the other. Bills must be defrayed when payable. This is particularly true in the public school business where, with approximately three-fourths of the expenditures made for personal services, the heaviest obligations fall due on payroll dates.

Theoretically, the most economical use that can be made of moneys received would be to control receipts and expenditures in such a way as to have available the exact amount of cash necessary to meet obligations as they fall due from day to day. In practice, this is not possible because of many uncontrollable factors. Variations from the ideal, when taxes are levied in advance of need, when money is borrowed in anticipation of revenue, or when faulty financial management exists, involve a burden of cost that must ultimately be paid by the tax payer. The resulting cost is expressed in less money available for current school use. The expenditure is represented either as a loss to the taxpayer because he has been deprived of the use of his money or as a charge on his tax bill, i.e., interest payment on borrowed funds, for the use of credit in the form of temporary loans. The more nearly management can approach the ideal, the lower will be this cost.

On first thought it seems that the question of income control is

of little concern to the school authorities of "dependent" * school systems. In the long run, however, inefficient control of income, irrespective of the location of responsibility, will be reflected in the budget allowance made available for public school use. The problem is of more direct and immediate concern to school officials of "independent" school systems.

FISCAL DEPENDENCE AND INCOME CONTROL

The degree of fiscal dependence of a local school system affects the attitude of school officials with respect to the responsibilities for the control of public school income. In the extreme cases where the available public school moneys represent a municipal appropriation and are just one of the general municipal accounts, the school authorities act as a department of city government in that they are one of the spending agencies.[1] The only accounting obligation they have is to keep within the appropriations. Even this responsibility may be removed where the organization requires that every purchase order be approved by the municipal auditor before it is valid. Full responsibilities for adequate use of funds cannot be placed on the school board, under these circumstances, although in the public mind there is usually a failure to appreciate the circumstances or conditions under which the school officials function. No plan can be satisfactory in the long run which does not give the school board an adequate accounting control of income. On the other extreme are those cases in which the school boards are fiscally independent, to the degree that even the collection of revenues is under their immediate control or direction. Between these extremes are many variations, each case presenting to those responsible for the local administration many unique problems for solution.

Adequate administrative control of finances in any enterprise cannot be possible unless those in charge are directly conscious of the resources made available to operate the undertaking. Irrespective of the offices in which responsibility for funds is centered, the school officials will need for their use the data made available through adequate local accounting controls of income as well as expenditures.

* For definition, see J. R. McGaughy, *The Fiscal Administration of City School Systems*. The Macmillan Co., 1924.

[1] *Survey Report of the School System of Springfield, Mass., 1923-1924*. Division of Field Studies, Institute of Educational Research, Teachers College, Columbia University, New York City. p. 102.

Otherwise, it has been found impracticable to operate efficiently in dependent school systems.[2]

When these two major items are not always under the direct control of the school authorities, the public cannot hold them accountable or responsible for inefficient management of income. Since state aid is particularly a grant to the school district, an organization of the dependent type cannot plan the income budget without full and detailed information concerning amounts of apportionments and dates when funds were received. Unless the public is fully aware of the difficulties which may arise, and experience shows that as a rule they do not discriminate in these matters, the school board and their officials will bear the brunt of public criticism when conditions are not as they should be. Under these circumstances, it becomes the duty of the school officials to keep the community informed of the facts. It must be constantly kept in mind that, irrespective of responsibility, inefficiency in management under these circumstances has a direct bearing on educational service, and the child suffers the loss.

LAWS AND INCOME CONTROL

The collection of school taxes frequently creates situations[3] over which the local school board may have no power, yet when considered as a part of the efficient management of schools the board is held responsible. Property assessing authority may be in the hands of municipal or county offices; these same offices may be required to certify the tax roll to the school officials, and the laws may limit the mill tax which can be levied. Under these circumstances, property assessments may be very low, or may suddenly be changed, or the tax duplicate may be delayed in transmission, creating conditions in which the school authorities may be temporarily helpless.[4]

Even the laws involving the levying and collection of school taxes leave the local school board powerless to provide the necessary funds, yet when considered as a part of the efficient management of schools, they are matters which should frequently arouse collective action on

[2] *Ibid.*, p. 102.

[3] Mt. Gilead, O. Facing a shortage of funds, the school board has called an election to vote a three-mill levy in November. Only eight months of school was possible last year and funds are still short this year. *American School Board Journal*, November, 1924, p. 74.

[4] In 1922, the county commissioner of Schuylkill County, Pa., because of certain litigations regarding assessments of coal lands, refused to issue the tax duplicate to the school board of Pottsville, Pa. September came and no taxes had been collected. Schools were kept open only through the insistence of the State Superintendent of Public Instruction.

the part of school boards resulting in modification of the tax collection procedure.

THE CONTROL OF INCOME FROM STATE AID

States have not as a rule provided adequately for the payments of state aid. School authorities cannot always determine when these funds will be received. In fact, methods of apportionment in many states make it impossible, when budgets are planned, for school districts to anticipate with any degree of certainty the amount due from this source. Even though these amounts are specified in law, the failure of a state to pay promptly when funds are due places no obligation on the state but leaves the local school district with the burden to carry. Politics frequently has played an important role in these delays. An attempt to adjust the problem of the date of payment of state aid is well illustrated by the following extract:

> The amount apportioned and allotted to each school district shall be divided into equal semi-annual installments, and the Superintendent of Public Instruction shall draw his warrants semi-annually upon the State Treasurer in favor of each district for the amount to which it is entitled, and payment thereof shall be made to fourth-class districts during the months of February and August of each year, to second and third-class districts during the months of March and September of each year, and first-class districts during the months of April and October of each year.[5]

ALLOCATING STATE AID

State aid and support are allocated frequently on the basis of many factors which are variables and difficult to determine in advance, as, for example, various elements of school population and amounts expended currently by local authorities, as in the case of transportation and tuition payments. It is a vexing problem for state authorities to anticipate the actual amounts of state money to be paid. This has resulted in frequent delays in payments necessitated by waiting for a deficiency appropriation bill to be passed by the subsequent legislature. In the state of Pennsylvania,[6] the deficiency appropriation in 1921 necessary to meet state obligations to local schools was $2,730,924, while in the next session of the legislature it was $3,930,481. Local school systems were obliged to meet this shortage in anticipated revenue in some form or other. The burden of cost was

[5] *Pennsylvania School Law*, 1923, Sec. 1210, Paragraph 23. Harrisburg, Pa.
[6] *The Budget, Commonwealth of Pennsylvania, Biennium 1925-1927*, p. 13. State Printer, Harrisburg, Pa.

on the individual school district. To obviate this situation in the future, the method of apportionment provides that the payments to be made for the ensuing two years shall be determined in advance.

The Superintendent of Public Instruction shall ascertain and determine the amount of funds required to meet each of the four payments to school districts which become due and payable within the two fiscal years beginning June first, one thousand nine hundred and twenty-three, and ending on May thirty-first, one thousand nine hundred and twenty-five, and each biennium thereafter, on the data and material contained in the certificates, which school districts are required by law to file with the said superintendent on November first immediately preceding the beginning of each biennium, and the said superintendent shall also apportion and allot the same to and among the respective districts: Provided, That the amount paid to any school district within any biennium shall in no case exceed an amount computed on the data and information contained in the certificate required to be filed in the November immediately preceding such biennium.[7]

There are times, however, when the failure of the legislature to make a deficiency appropriation may cause a complete loss to school districts [8] of part of this state aid due, or when deficiency appropriations are made, the balance due may not be paid for several years.[9]

The following report of the state board of education of Minne-

Items of State Apportionment Minnesota, 1925	Amount Due	Amount Paid
Regular Item (State Aid)	$1,720,499	$1,600,064
Building	84,694	78,765
Transportation	801,161	745,080
Special Department	315,596	293,505
Association Aid	29,600	27,528
Transportation Non-Resident High School	1,004,732	934,401
Supplemental (legal tax levy)	1,679,356	1,561,801
Defectives (special classes)	363,662	338,206
Adjustment (last year's aid)	2,603	2,603
Teacher Training Departments	214,391	214,391
Totals	$6,216,244	$5,796,343

[7] *Pennsylvania School Law*, 1923, Sec. 1921. Harrisburg, Pa.

[8] The allocation of state funds to public schools in Minnesota for 1921 resulted in a cut of 22 per cent in some districts from state funds due. This was paid in full in 1923.

[9] The public schools will suffer directly for the curtailed state aid in Missouri due to retrenchments in state government. Last year, schools received $4,000,000 from the state, but it is doubtful whether this amount will reach $3,500,000 this year. *American School Board Journal*, January, 1925, p. 106.

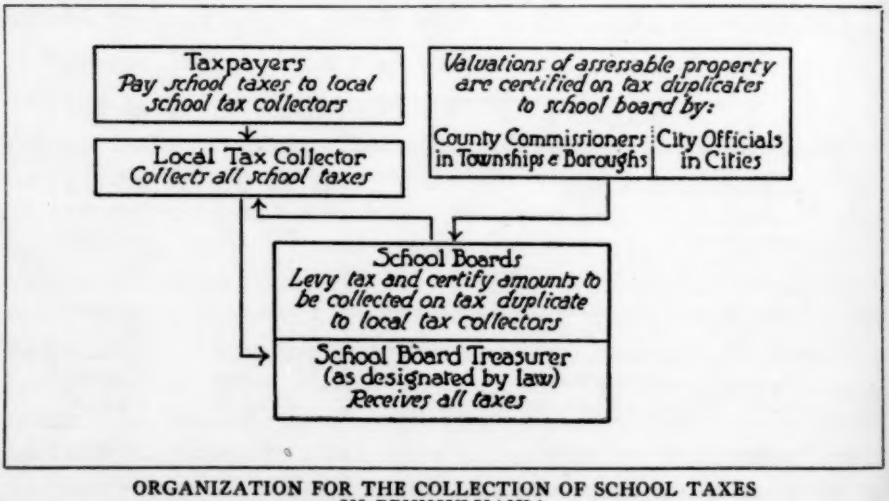
sota [10] shows that the large percentage of state aid to public schools was apportioned on the basis of 93 cents on the dollar.

It is therefore important for school authorities not only to determine what amount of state aid the schools are to receive, but to have adequate records to determine how much the district can anticipate during any one year of the amount due. Otherwise, the result may be unnecessary borrowing.

TAX COLLECTION AND INCOME CONTROL

The administration and accounting of tax income will depend largely on the procedure required by the laws of the state in which the district is located. There are two distinct types of organization for the collection of taxes, with many variations. The state of Pennsylvania [11] represents the extreme localization of the tax collecting function, and Minnesota is an illustration of the complete centralization of tax collecting responsibilities. Each of these systems and variations from these will exhibit different administration and accounting problems connected with income control.

DIAGRAM 1

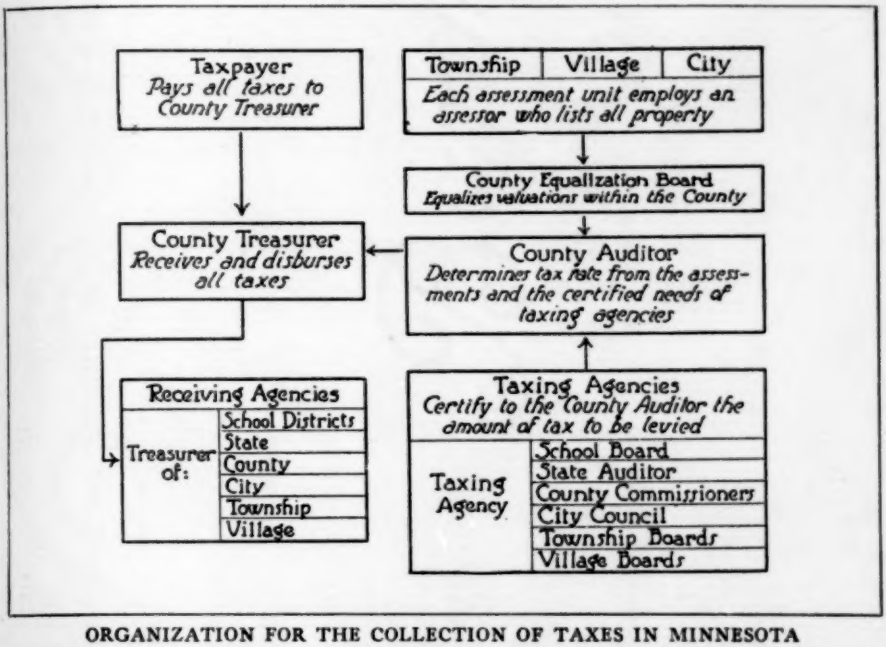

Taxpayers
Pay school taxes to local school tax collectors
Local Tax Collector
Collects all school taxes
Valuations of assessable property are certified on tax duplicates to school board by:
County Commissioners in Townships & Boroughs
City Officials in Cities
School Boards
Levy tax and certify amounts to be collected on tax duplicate to local tax collectors
School Board Treasurer
(as designated by law)
Receives all taxes

ORGANIZATION FOR THE COLLECTION OF SCHOOL TAXES IN PENNSYLVANIA

School tax collection in Pennsylvania is localized. The school board has full responsibility for levying and collecting taxes. There is no attempt to equalize taxes in this state.

[10] Annual Report, 1925. Advanced Sheets. Minnesota State Board of Education, St. Paul, Minn.
[11] Engelhardt, Fred and Others. *Cost of Collecting School Taxes in Minnesota.* Research Bulletin, January, 1926. University of Minnesota, Minneapolis, Minn.

DIAGRAM 2



ORGANIZATION FOR THE COLLECTION OF TAXES IN MINNESOTA

All taxes are levied and collected by county officials. Property is assessed by local agencies and equalized by county officials.

The Pennsylvania system is a plan in which the school board has full jurisdiction, requires adequate check of tax duplicate, accounting with tax collector (an officer responsible to the board), reports from tax collector, record of delinquent taxes, records of tax levies,[12] and a record of exonerations as well as detailed analysis of monthly tax collection and penalties since the tax collector is paid on a fee basis. This organization is illustrated in Diagram 1.

The other extreme, illustrated by the state of Minnesota, as shown in Diagram 2, is a case where all taxes are levied and collected by the county auditor. Under these circumstances, an account with the auditor's office must be maintained by each school district that it may know what moneys are being received, whether current or delinquent. Otherwise, no accurate knowledge of tax income is established.

[12] The school board of Lansing, Mich., contemplates legal action to recover money due for uncollected taxes since 1916. The amount involved is approximately $165,000 and the interest amounts to nearly $5,000. *American School Board Journal*, September, 1925, p. 82.

The administrative responsibility and cost in the Pennsylvania plan for tax collection fall upon the school authorities. The burden of assessment, however, is not a direct charge against the funds of the local school district. The cost of the tax collecting service is much greater in this state than where taxes are collected centrally. The cost will vary throughout the state, since it is sure to have political implications. The cost of tax collection in certain selected districts [13] of this state compared with the most of administrative salaries is shown in Table I. Further illustrations of tax collection costs in this same state [14] grouped by counties appear in Table II. Approximately two cents of every dollar collected for the public schools of Pennsylvania go to the local tax collector and are thus lost in the advancement of education.

TABLE I

VARIATIONS IN COST OF TAX COLLECTION IN SELECTED SCHOOL DISTRICTS IN PENNSYLVANIA, 1921–1922

School District	Average Daily Attendance	Current Expenditure	Fees Paid Tax Collector	Salary of Superintendent
Allentown	10,529	$ 219,000[a]	$ 3,000	$5,000
Erie	11,690	1,193,000	19,906	5,600
Lancaster	6,424	368,000	2,350	4,000
Scranton	15,320	1,462,000	19,906	6,000
Easton	5,163	371,000	6,768	4,233
Newport	2,393	217,000	8,370	3,600
Shenandoah	1,205	146,000	6,205	2,700
Throop	1,424	101,000	5,000	3,170
Washington	3,778	221,000	4,900	3,400
Winton	1,084	62,000	3,145	2,700
Wilkenberg	3,759	377,000	4,300	4,600
Arnold[c]	1,057	54,700[b]	1,333	
Cass	733	82,200	3,451	
Salem	938	43,500	1,325	
Sugar Creek	668	37,100	1,806	
Wilson	910	44,200	2,167	

[a] To nearest thousand dollars.
[b] To nearest hundred dollars.
[c] No superintendent employed.

[13] *Statistical Reports*, 1919-1921. State Department of Public Instruction, Harrisburg, Pa.
[14] *Pennsylvania School Journal*, June 1926, p. 656. Harrisburg, Pa.

TABLE II

RELATION BETWEEN SCHOOL TAXES AND COST OF TAX COLLECTION IN FIVE PENNSYLVANIA COUNTIES

Counties in Pennsylvania	Total School Tax Collected	Cost of Collection	Relation Between Cost of Tax Collection and Amount Collected
Allegheny	$19,675,726	$247,625	1.26%
Dauphin	2,075,750	26,155	1.26
Delaware	2,904,369	75,262	2.59
Luzerne	3,869,036	102,871	2.66
Philadelphia	22,833,269	39,884	0.17

A comparison of tax collection costs in Pennsylvania and Minnesota is presented in Table III. In Minnesota,[15] the responsibility for collecting all state taxes within the state falls upon the county auditor.

TABLE III

COMPARISON OF COSTS OF COLLECTING SCHOOL TAXES, EXCLUSIVE OF ASSESSORS' COSTS, IN EIGHT COUNTIES IN PENNSYLVANIA AND THREE COUNTIES IN MINNESOTA

Counties	Population 1920	Collection Cost	School Taxes	Average Enrollment	Cost per Dollar Collected	Cost per Pupil
Penn. (1919-22)[a]						
Adams	34,583	$5,246	$166,232	6,487	$.0316	$.809
Bradford	45,088	9,267	355,869	9,340	.0260	.992
Elk	21,977	3,227	113,995	4,860	.0283	.664
Franklin	52,555	7,620	213,764	8,917	.0356	.854
Juniata	14,464	2,352	70,717	3,344	.0332	.703
Lebanon	38,509	8,628	264,933	7,990	.0322	1.080
Mifflin	17,732	2,927	116,806	4,286	.0165	.683
Potter	21,089	3,898	128,264	4,748	.0304	.821
Minn. (1921-24)[b]						
Meeker	18,103	3,480	262,673	3,586	.0094	.690
McLeod	20,444	2,328	286,954	4,264	.0081	.550
Freeborn	24,692	3,434	493,631	6,033	.0069	.570

[a] Excluding cities of first, second, and third class. Average for 3 years.
[b] Cost of collecting school taxes exclusive of assessing costs. Average for 4 years.

State aid is likewise distributed through this office. Uniformity of cost to districts throughout the state can be expected. The actual payment for this service in this case is from county funds and does

[15] Engelhardt, Fred and Others. *Cost of Collecting Taxes in Minnesota.* Research Bulletin, January 1926. University of Minnesota, Minneapolis, Minn.

not appear as a direct charge against the local school districts. These costs are not usually included in fiscal statements of dependent school systems, but they should be considered in comparing educational costs. These facts are set forth to show that not only are the sources of income vital in the administration of a public school system, but the machinery for collecting and accounting plays a large part in the efficiency of management.

CONTROL OF INCOME FROM TAXES

Attention has already been drawn to the effect of law upon income control. There are other features of the legal control concerned with the immediate problem of tax payment [16] which will require careful study before the difficulties can be satisfactorily met. If cash is to be made available when bills fall due, the tax payment procedure which consistent with efficient management insures the needed cash with the minimum cost to taxpayer is no doubt the best. The following clauses from a law represent an attempt to insure a greater regularity of tax income through an adjustment of penalties: [17]

1. That a rebate of one per cent shall be allowed on all taxes paid before August 1st.

2. A penalty of five per cent shall be added on all taxes not paid before October 1st.

3. On the first day of January following and on the first day of each succeeding month thereafter during which taxes remain unpaid, an additional penalty of one-half of one per cent shall be added.

An analysis of actual accounting facts may possibly show that not only should the penalties be graduated, but a graduated schedule of discounts for prompt payment might reduce the cost associated with borrowing in anticipation of taxes and with the plan of carrying large balances where income cannot be anticipated with any degree of regularity. The following press editorial is an interesting comment on this problem:

Convenience of the taxpayers is the chief cause of the city in not receiving

[16] The board was absolved from any blame for conditions which caused them to issue a statement that schools would be closed because of a depleted treasury. To continue the schools, the citizens of the town (Miami, Okla.) subscribed the $21,000 necessary to carry the schools through for the full nine months. *American School Board Journal*, March, 1925, p. 92.

[17] *Digest of Educational Laws*. Bulletin, May 25, 1915. State Department of Education. Harrisburg, Pa.

"Report to board of education of Chicago, Ill., shows that there is due the schools on delinquent real estate taxes approximately $26,000,000. Of this amount, about $12,000,000 are due on real estate forfeited to the state for non-payment of taxes." *American School Board Journal*, October 1925, p. 79.

funds more evenly through the year with which to meet expenses. This situation is the occasion for a proposal to amend the city charter, to allow the issuance of short-term loans or certificates of indebtedness, to meet payrolls and other bills when there is no money immediately available.[18]

BUDGET ESTIMATES OF TAX INCOME AND RECEIPTS

A study of the accounts in most school districts will show that tax receipts and the amount levied will not be equal for any one year.

In Table IV, the relationship between the certified budget estimates presented by the school official of a district for each of the past eleven school years and the actual cash receipts paid by the county treasurer during each of these school years is shown. The summary of the surplus and deficits noticed in each year's payments shows a net deficit for the eleven years of $51,308. This represents approximately 3 per cent of the total budget requests of this period.

TABLE IV

RELATIONSHIP BETWEEN THE ANNUAL BUDGET ESTIMATE CERTIFIED TO THE COUNTY AUDITOR BY A LOCAL SCHOOL DISTRICT AS THE CURRENT NEEDS FOR A SCHOOL YEAR AND THE AMOUNTS RECEIVED DURING THE SAME PERIOD—1914–1925

School Year Ending	Amount Certified to County Auditor to be Collected for Current Local School Budget Needs	Amount Received by the School District from the County Treasurer During Each of These School Years	Amount the Receipts Are in Excess of the Budget Request for the School Year	Amount the Receipts Fall Short of the Budget Request for the School Year
1915	$80,000	$56,130		$23,870
1916	81,000	106,883	$25,883	
1917	92,300	91,070		1,230
1918	92,300	93,233	993	
1919	92,300	66,827		25,473
1920	96,200	108,340	12,140	
1921	127,370	129,838	2,469	
1922	202,168	167,744		34,424
1923	227,199	162,552		64,648
1924	211,960	274,422	62,262	
1925	222,032	216,682		5,350

This 3 per cent represents a serious problem in control of income to the administration of school systems involved.

MONTHLY DEMANDS FOR CASH

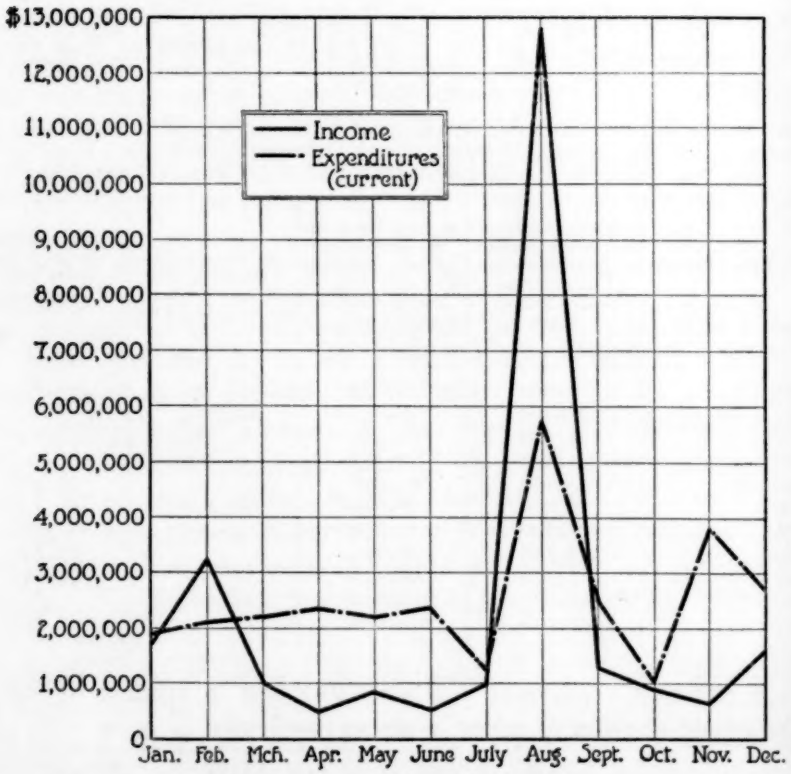
A diagrammatical presentation of the monthly demand for cash and available cash exemplifies very clearly the problems confronting

[18] Editorial. *St. Paul Pioneer Press*, July 3, 1926. St. Paul, Minn.

those responsible for the fiscal affairs of a local school system. Each of the cases presented in Diagrams 3, 4, 5 and 6 is peculiar to a local situation and requires special study for solution.

Just a cursory study of these selected cases seems to indicate that the control of income is a topic which should receive the consideration and thought of every school board and the fiscal officers who are either directly or indirectly responsible for the funds of the district. The many problems of bank balances, cash reserves, temporary loans, tax payments, and purchasing and payment arising out of these illustrations are of a nature that will require local study and analysis.

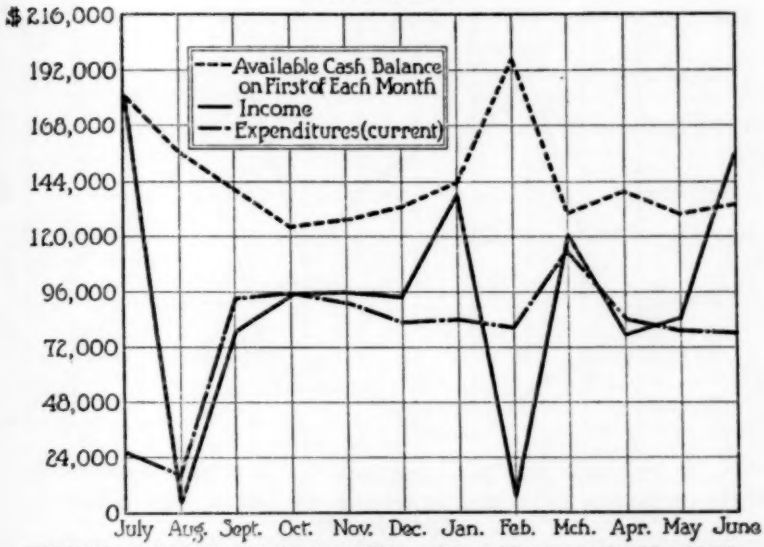
DIAGRAM 3



INCOME AND CURRENT EXPENDITURES FOR EACH CALENDAR MONTH FOR SCHOOL YEAR BEGINNING JANUARY 1, 1924

Note that monthly payments are not uniformly the same. To meet the bills when due, the school board must resort to borrowing or must carry a large balance. Borrowing is evidently resorted to here.

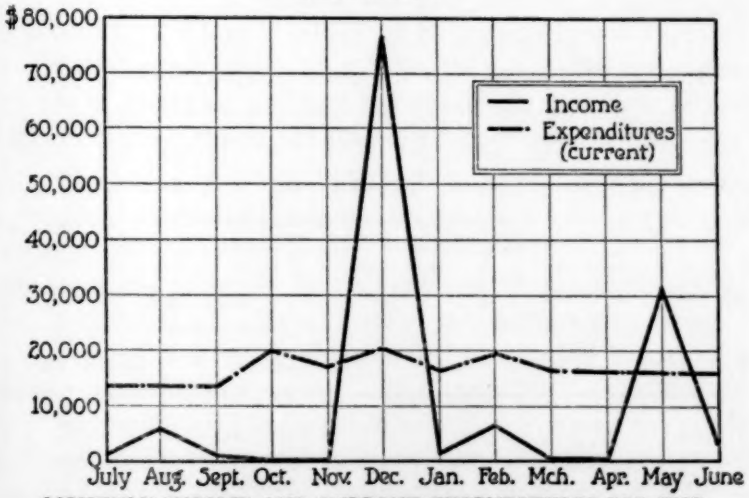
DIAGRAM 4



INCOME, CURRENT EXPENDITURES, AND CASH BALANCES AVAILABLE AT THE BEGINNING OF EACH MONTH DURING ONE YEAR

Note that ample cash reserve is made available here. No need of borrowing. The question may well be asked—"What balance should be carried?"

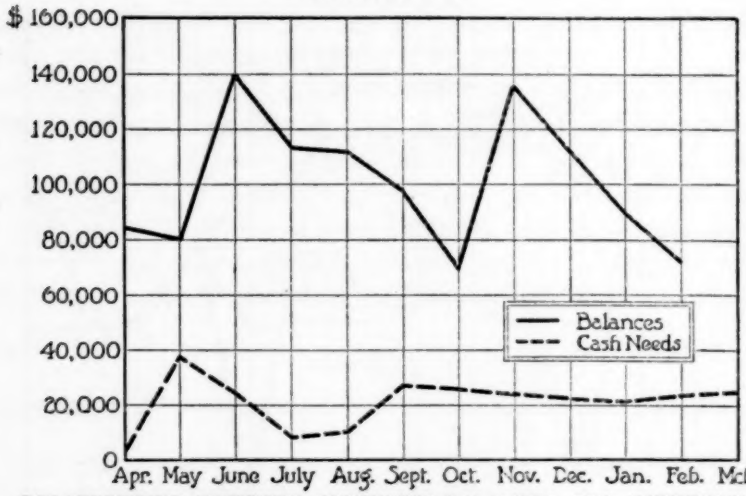
DIAGRAM 5



MONTHLY INCOME AND CURRENT EXPENDITURES FOR THE SCHOOL YEAR 1924-1925

Note that in this case monthly cash needs are uniformly the same. As in Diagram 3, the school board evidently must resort to borrowing to meet obligations during certain months of the year.

DIAGRAM 6



RELATIONSHIP BETWEEN MONTHLY BALANCES AND MONTHLY CASH NEEDS

Note. The monthly cash balance approximates $70,000. It is questionable whether a school board in a community of this size can justify such a reserve.

INTEREST RATES

The difference between the amount a public school system pays for the capital it borrows and the amount it receives for available cash balances is well illustrated in Tables V and VI. In these tables, it appears that while Cleveland [19] paid approximately 4.5 per cent for the use of money necessary for building purposes, it received an average of approximately 3.0 per cent for credit balance in the bank.

TABLE V

INTEREST RATES ON BOND ISSUES
CLEVELAND PUBLIC SCHOOLS

Year	Bond Issues	
	Amount	Interest Rate
1909	$ 200,000	4.0%
1910	500,000	4.5
1911	500,000	4.5
1912	1,400,000	4.0
1914	500,000	4.5
1915	1,000,000	4.5

[19] Clark, Earl. *Financing the Public Schools.* Cleveland Survey, Cleveland, O. Adapted from tables on pages 84-88.

TABLE VI

INTEREST RATES IN BANK BALANCES
CLEVELAND PUBLIC SCHOOLS
1916

Bank	Maximum Authorized Deposit	Rate of Interest Paid
Peoples Savings	$100,000	3.60%
Garfield Savings	100,000	3.26
Lake Shore Banking & Trust Co.	200,000	3.25
Clark Avenue Savings	50,000	3.25
State Banking & Trust Co.	250,000	3.15
Lincoln Savings & Banking Co.	50,000	3.15
Pearl Street Savings & Trust Co.	200,000	3.13
First National Bank	300,000	3.10
Superior Savings & Trust Co.	300,000	3.05
Hough Bank & Trust Co.	25,000	3.03
Central National Bank	300,000	2.85
Citizens Savings & Trust Co.	42,500	2.77
Cleveland Trust Co.	42,500	2.77
Worthingham Savings & Banking Co.	15,000	3.00
Hugh Bank & Trust Co.	25,000	2.88

TEMPORARY LOANS AND INCOME CONTROL

When monthly cash needs and receipts are not equal, some plan must be provided to secure the necessary money when income falls short of cash requirements. There are two ways in which this can be done, either by anticipating the situation and building up a cash reserve, or by buying credit until taxes are paid. In theory, both procedures are sound in principle and consistent with acceptable business practices when carried on economically [20] and in the interest of the schools and the taxpayers.

The questions of credit and temporary borrowing are highly significant in their relationship to income accounting and control. There are times when it is much cheaper for the school board to borrow than to create a large reserve. There are other occasions when, because of negligence of the fiscal officers, the nature of the tax laws, or tax-payment practices, resort to temporary and emergency borrowing

[20] The school board of Joliet, Ill., has been obliged to borrow $75,000 on tax anticipation warrants in order to pay salaries and operating expenses until the 1925 taxes are received. *American School Board Journal*, January 1926, p. 14.
The school board of Indianapolis, Ind., has been given a million-dollar loan at an interest rate of 3.14 per cent. The loan was in anticipation of the annual tax which will be due the board soon. *American School Board Journal*, April 1925, p. 82.

is the only way out. The schools must be in operation for continuous educational services, and the children should not be required to suffer because of temporary financial embarrassments.

There are a number of elements relating to credit and temporary borrowing that school officials should consider carefully in determining the local policies to be followed in regard to this important financial problem. Careless practice and borrowing policies founded on unsound principles will invariably lead a school system into serious difficulties. The following summary represents the more important elements:

School authorities should recognize the differences between borrowing (temporary loans) for school purposes and the practices followed in private enterprise.

a. Temporary loans for school purposes are usually easily secured.

b. The same scrutiny into the financial conditions is not essential as in the case of private enterprises.

c. Temporary loans, in public school financing, at critical periods may tempt the politician in that the practice provides a possible means of gaining temporary political advantages in keeping down the tax rates.

d. The general public can readily be deceived in regard to indebtedness.

e. Poor budgeting is frequently detected by the amount of temporary loans outstanding.

f. School boards where accounts are not carefully kept may pass on to their successors an embarrassing deferred debt.

The following principles should guide school boards in forming policies regarding the use of temporary loans as a method of providing current cash needs:

1. Temporary loan needs should be anticipated and planned for as a definite part of the program of budget income.

2. The amount to be borrowed should be based on careful accounting estimates and should not be the result of the guess or judgment of any members of the school board or official staff.

3. Temporary loans should be accounted for in as careful a manner as all other financial matters.

4. Cost of borrowed money should be known, made public, and economically justified.

5. If the public is responsible (due to delayed tax payments) for the borrowing, the cost of this procedure should be given publicity, and constructive, corrective measures suggested and carried out.

6. Every dollar unnecessarily expended for purposes other than direct educational service is a waste and should be avoided.

7. Temporary borrowing may at times be the most economical procedure of financing. It should be necessary to resort to it only when the case can be economically justified or when unavoidable emergencies arise.

8. Temporary loans should not be renewed.

9. Bonds should not be issued to redeem temporary debt, except under extreme conditions.

10. Temporary loans should be paid each year.

11. Temporary loans should be a minimum consistent with good management and maximum economy.

12. Financial statements should show clearly temporary loans and their cost.

13. Adequate monthly and yearly records of income and expenditures should be kept in order that trends and estimates regarding income and cash needs can be more accurately determined.

14. Budgets should provide for a minimum necessary cash balance to be carried over from month to month in order to reduce borrowing to a minimum.

15. Excessive balances are as costly as too frequent borrowing. Only through accurate accounting can the proper balance be determined.

16. The borrowing program should be planned and estimated in advance.

THE CASH RESERVE AND INCOME CONTROL

The maintenance of a cash reserve, like borrowing, is a sound procedure when controlled by proper accounting practice and when carried on under good business management. The following principles should be carefully considered in planning the reserve to be maintained from month to month and year to year:

1. The reserve should be a minimum consistent with economy and prompt payment of obligations.

2. Collecting money from taxpayers in advance of need may be as costly a performance as injudicious borrowing.

3. Reserve cash and the temporary loan programs should be coordinated.

4. Interest on cash reserves should be a maximum and at least equivalent to the return on private funds.

5. The school depository should be required adequately to protect and insure all school funds deposited in any bank.

SUGGESTED FORMS FOR THE CONTROL OF INCOME

In order properly to control the income of a school system, the following reports and statements should be available for the school board and the school executive.

DIAGRAM 7

Month[a] / Item[b]	January		Febru		November		December	
	Estimated	Actual	Estimated	Ac	Estimated	Actual	Estimated	Actual
Taxes								
State Aid								
Tuition								
Other Sources								
Total								

a = Monthly designation depends on local fiscal year
b = Items depend on local sources

MONTHLY STATEMENT OF INCOME

School District .....

School Year 19.., 19..

Diagram 7 is suggested as a means of getting a record of monthly income. In this report, the estimates as well as the actual incomes should be recorded. The items to be recorded should depend primarily on the local sources of income.

The items to be listed on Diagram 8 are to be determined by local accounting needs and local classification of accounts. A recapitulated total of local salary needs will be very convenient in planning for the monthly payroll.

DIAGRAM 8

Month[a] / Item[b]	January		February		November		December	
	Estimated	Actual	Estimated	Actual	Estimated	Actual	Estimated	Actual
Salaries and Wages								
Supplies								
Textbooks								
Sinking Fund								
Loan and Interest								
Fixed Charges								
Other Expenditures								
Total								

a = Monthly designation depends on local fiscal year
b = Items depend on local sources

MONTHLY STATEMENT OF CURRENT EXPENDITURES
School District .....
School Year 19.., 19..

The data recorded on Diagram 9 should be recapitulated and made available for yearly analysis and in the planning of the budget. A complete analysis of temporary loan needs can be made by keeping the records of these loans in the manner suggested in Diagram 10. The borrowing program may be planned and controlled intelligently by such a procedure.

DIAGRAM 9

Item	January 19		February 19		Remarks
	Estimated	Actual	Estimated	Actual	
Cash on hand beginning of month					
Income during month					
Expenditures for month					
Balance					
Loans required					

COMPARATIVE ANALYSIS OF MONTHLY CASH NEEDS
School District .....

DIAGRAM 10

Item		January	Februar	November	December	Remarks
Loans outstanding at beginning of month	A					
	B					
Interest due	A					
	B					
Payments to be made	A					
	B					
Additional Loans	A					
	B					

A=Estimated B= Actual

ANALYSIS OF BORROWING PROGRAM

School District .....

School Year 19.., and 19..

CONTROL THROUGH TRANSFERS BETWEEN FUNDS

Where the resources of public school systems are restricted and where school boards have within their jurisdiction certain trust funds, transfers from fund to fund as a means of income control should be avoided. In fact, such transfers in the majority of cases are prohibited by law and thus are illegal. Where the assets of special funds are legally derived from current receipts as in the case of sinking funds and teacher pension funds locally operated, the transfers should be regular and in accordance with a fixed and formulated plan. This should be done even though the law may not specify the procedure.

PROTECTING RESOURCES AGAINST RISK

Abuse of resources or the misuse of public funds is unpardonable in public school affairs. Irregularities apparent or suspected may lead to such a loss in public confidence that the schools may suffer immeasurably. Cash, materials and property in the process of use are sub-

ject to hazards and risks which are not always under the control of the administration. Fundamentally, the same principles hold in regard to protection, irrespective of the form in which the resources exist.

BONDING SCHOOL OFFICIALS

All school officials employed who are responsible for or who are associated with the handling of cash should be protected from the possibilities of unfair criticism. Then, again, the funds they handle should be protected against possible misuse or loss. The individual is usually protected in the audit of the accounts, while the funds are insured against loss by bonding the individual. School law may regulate the amount which officials may carry. The following extract of the New York State [21] school laws outlines the general legal requirement in that state:

> Such treasurer and collector shall each, and within ten days after notice in writing of his appointment, duly served upon him, and before entering upon the duties of his office, execute and deliver to the said board of education a bond with sufficient penalty and sureties as the board may require, conditioned for the faithful discharge of the duties of his office; and in case such bond shall not be given within the time specified, such office shall thereby become vacant, and said bond shall thereupon by appointment fill the vacancy.

The amount of bond to be carried is usually proportionate to the funds handled. School boards should not accept bonds where local individuals act as the bondsmen, but should insist that they be secured through some reputable surety company. The premium payments should be paid out of local school funds.

PROTECTING FUNDS IN DEPOSITORIES

Banks in which school funds are deposited not only should be bonded, but should be required to insure the deposits against loss. The bonding of the bank does not protect the funds particularly in cases where the institution becomes insolvent,[22] and the bondsmen

[21] *New York School Law*, 1923, Part 5, p. 86. Albany, N. Y.

[22] Data supplied by the superintendent of schools.

Case 1—Huron, S. D. Bank failure in 1925.
Assessed valuation of property—$10,200,000.
Annual current expenditures (1924-1925)—$157,648.00.
Amount of school funds in bank at time of failure—$16,920.00.

Case 2—Timber Lake, S. D. Bank failure in 1925.
Assessed valuation of property—$3,350,889.
Annual current expenditures (1924-1925).
Amount of school funds in bank at time of failure—$29,534.00.

are residents of the community. Some illuminating cases appeared in the bank failures in the Northwest [22] during the period 1923-1926. In many of these cases, the bank was bonded and the bonds were valueless, for the local bondsmen used the same institutions for their own funds. Not only should the depositories be bonded, but the funds on deposit should be insured against loss. There is no uniformity in the laws designating the place where or the conditions under which depositories are to be controlled. Patty [23] states that:

> Approximately one-half of the states still permit local autonomy in this important function. . . . Eleven states have attempted to eliminate the risks involved in the methods of using local depositories by requiring banks that act in that capacity to furnish bond.

Desirable changes in the laws will be brought about only through the initiative of school boards and their executive officers who realize the importance of providing more adequate safeguards in this field.

[23] Patty, W. W. "Legal Promises for Custody . . . Public Funds." *American School Board Journal*, March 1926, p. 47.

This is the second of a series of eight articles by Professors N. L. Engelhardt and Fred Engelhardt. The third will appear in an early number of THE RECORD

NEW STUDIES IN EDUCATION

SCHEUBEL AS AN ALGEBRAIST *

THIS is a study of algebra in the middle of the 16th century, together with a translation of and a commentary upon an unpublished manuscript of Scheubel's, now in the library of Columbia University.

In order to comprehend the cause of the remarkable advance of algebra in the middle part of the 16th century with Johann Scheubel as the central interest (before practically unknown in the history of mathematics), it is necessary to study the conditions in the field of mathematics which mark out this course of progress in the domain of analysis.

The author transcribed and translated the Latin manuscript of Scheubel (in German script). When it was compared with his printed algebra of 1551 (in Latin) it was found that only two problems were repeated in the manuscript. A photostatic copy was made of this manuscript. In referring to the most important words used in the manuscript a Latin glossary was made in which the pages and lines of reference are indicated.

The author wrote to the universities of Tübingen and Stuttgart concerning the life and works of Scheubel and consulted the leading histories of mathematics and comparatively all of the important works which bear directly upon the subject of algebra. These works in English, Latin, French and German include such authors as Smith, Heath, Rosen, Hutton, Wallis, Mikami, Peet, Cantor, Heilbronner, Klupfel, Nesselmann, Montucla, Pantaleon, Ramus, Poggendorff, Staigmüller, Treutlein, Tropfke, Vossius, Zellern, Cossali, Hankel and Woepcke. The author also consulted, for the greater part, the original writings of the men who have had the most far-reaching influence upon the development of algebra up to, and including, the 16th century.

The very earliest traces of algebra are found in the oldest of extant deciphered and mathematical manuscripts, the *Ahmes Papyrus* (*c.* 1550 B.C.), which contains equations in rhetorical forms, problems involving elementary series and arithmetical and geometrical progression. But no good algebraic symbolism is used and there is no evidence that algebra existed as a science.

The Chinese, chiefly interested in applied problems, solved rhetorical quadratic equations, and gave as their greatest contribution to algebra certain ingenious devices for treating numerical higher equations. Because of the uncertainty of their dates and the authenticity of their classics it is difficult to say when algebra began as a science in China.

In Greece, the geometric treatment of formulas, roots, and proportions, the duplication of the cube by the aid of geometrical curves, as well as the first

* By Mary S. Day. Teachers College, Columbia University, Contributions to Education, No. 219.

systematic solution of quadratic equations by means of the completion of geometric squares, may properly be considered as a phase of algebra.

Algebra gradually approached the scientific stage in the three centuries that followed the death of Pythagoras (501 B.C.), and with Diophantus (*c.* 275) the analytic treatment came into use. Algebra next flourished almost exclusively in the East. Then at the School of Bagdad the Mohammedans became the custodians of the Indian and Greek sciences and their leading writer, al-Khowârizmî (*c.* 825), gave the name to algebra and distinguished the six historical classes of simple and quadratic equations.

The 12th century was to Christian Europe a period of translations; the 13th century represented a period of awakening of the world from an intellectual stupor, a revival and development of algebra in China, in India and in Europe, with Fibonacci (1202) as the outstanding mediæval writer. The establishing of the universities in the 13th, 14th and 15th centuries has been the most potent influence in the development of the world's mathematical knowledge.

The science of algebra, almost stationary in the period from Fibonacci to Pacioli, received its earliest improvements in Italy. There through a natural outgrowth of circumstances, influenced by the invention of printing, a true renaissance in mathematics, which culminated in one of the leading developments of algebra in the 16th century, was effected. At the close of the 15th and during the 16th century the algebraic art gradually approached a modern development. Germany, influenced by such writers as Stifel and Scheubel, contemporary with Cardan and Tartaglia, moved toward the front in the mathematical progress of Europe, but with Italy always in the lead.

Thus we see that the conditions in the field have been such as to mark out a course of progress in algebra to include a better symbolism, and to permit of the solution of the cubic and bi-quadratic equations and of numerical equations of higher degrees. In fact, in the 16th century we find that mathematics, with its chief interest in algebra, experienced a more extensive development than it had known since the school of Alexandria produced its numerous scholars.

Johannes Scheubel, born August 13, 1494, in Kirchheim, Württemberg, was a student at the Universities of Vienna, Leipzig and then at Tübingen, where he became a professor of mathematics, and to which university he bequeathed his instruments and manuscripts at the time of his death, February 20, 1570. His publications include (1) *De Numeris et Diversis Rationibus seu regulis computationum opusculum* . . . Lipsiae, 1545. (2) *Compendium Arithmeticae Artis,* (3) *Euclidis Megarensis, Philosophi et Mathematici excellentissimi, sex libri priores,* . . . *Algebrae porro regulae* . . . Basel, 1550. (4) *Algebrae compendiosa facilisque descriptio,* Paris, 1551, (5) *Jacobi Fabri Stapulensis in Arithmetica Boethii epitome* . . . Basel, 1563. (6) *Das sibend, acht und neünt Buch des hochberümbten Mathematici Euclidis Megarensis* . . . Augsburg, 1558.

There are many, many proofs of appreciation, given by Scheubel's contemporaries, of an author who greatly contributed to the development and teaching of arithmetic, algebra and geometry.

Scheubel's excellent treatment of irrationals is far superior to that given by any of his contemporaries. Robert Recorde, the founder of the British

School of Mathematics, uses in the *Whetstone of witte* (1557) his same root symbolism and gives practically the same definitions and development of the four fundamental operations with surd numbers. His explanation of square root is in some respects the best of the century.

Bohnenberger calls attention to the fact that Scheubel's very important algebraic demonstrations of geometry were unusual and very elaborate for his time, and that his treatment of equations is exceptional. (Recorde confesses that he includes Scheubel's three types in his own two types of equations.) Scheubel demonstrates ingenious dexterity in his types of problems. For the greater part, Scheubel's different methods of solutions are arranged in logical steps.

Scheubel marks the beginning of that period of mathematical history in which algebra approached the modern form. Contemporaneously with the remarkable discoveries of the Italian mathematicians, algebra was increasing in popularity in France, in England, and in Germany, where the works of Scheubel and Stifel are noteworthy for their perspicuity and for the introduction of a more complete symbolism for quantities and for operations.

Even in his own day, Scheubel's influence had penetrated to foreign countries, especially to France. Peletier speaks of Nunez, and Riese, but questions whether their books had ever been published. Scheubel, whose work he greatly admired, he used to a considerable extent. But while his representation of characters, his treatment of irrationals, his extraction of roots, his equations and his problems resemble Scheubel's processes, they do not have Scheubel's scholarly development or appropriate applications. And Peter Ramus says that when he visited Europe and called upon all the great mathematicians he preferred the Germans as a whole to all others and that Scheubel should be honored above all his contemporaries as the pride of Tübingen. A little later, Rafael Bombelli, the most important Italian mathematician of the latter part of the 15th century, mentions first Scheubel, and then Stifel, as algebraists worthy of the name.

Scheubel's success as a teacher was also noteworthy. Indeed all of his works, except the last, were the result of his academic instruction and were written for his academic instruction. He wished to make algebra easy and interesting and therefore attempted to use vivid processes which would make the subject applicable to the ordinary business affairs of his day. Thus he hoped to unite practical life and academic instruction in presenting many types of practical problems. The fact that Recorde used comparatively these same types of problems is another proof of Scheubel's predominating influence in the *Whetstone of witte* (1557). Moreover, much of the terminology of elementary mathematics goes back to Recorde's works and a great part of it he also got from Scheubel.

No doubt Scheubel was also influenced by Stifel, but when the algebras of these two are compared, one is conscious of a marked contrast. The subject matter is to a great extent similar, but Stifel's presentation is somewhat antiquated, while Scheubel's is modern.

His presentation is modern in its logical development of subject matter, the arrangement of material for teaching purposes, and the decisiveness of his conclusions. His rules are clear cut and are followed by appropriate examples and because these examples are practical he

easily arouses the interests of his students. Scheubel was a modern also in that he was "concerned with the teaching of mathematics for the soul of the subject as well as its use in trade and in the shop; he had to meet the opposition of those who would teach only that which is immediately useful."

The student of mathematics will be interested in this study which shows the growth of algebra and reveals the science as a great stream rather than as a static mass. From the standpoint of the history of science, which stresses the accumulation of new material from the various fields of scientific works, no justification is needed for the publication of an unknown mathematical work, an unpublished algebra of about the year 1500 —for this work is really a missing link in the history of mathematics. Surely Scheubel, whose influence was far-reaching in the middle of the 16th century, deserves to be taken out of almost oblivion and to be given an important place in the history of algebra.

A STUDY IN THE PSYCHOLOGY OF LEARNING IN GEOMETRY *

WHAT difficulties will students experience when they attempt to solve geometry "originals"? Is it possible to construct, on the basis of student difficulties, a technique whereby students may learn how to attack exercises in geometry successfully as well as to detect errors in their solutions? What would be the effect of continued practice based upon this technique in the solutions of such exercises? Would this effect be equally profitable for superior, average, and below average students? Furthermore, would the students who used such a technique in the solution of exercises in geometry improve in their ability to solve problems non-mathematical in character? These questions form the core of the present study.

An experiment was conducted in a public high school of Yonkers, N. Y., by the writer, then a member of the staff of Lincoln School of Teachers College. The more traditional textbook method was used in two "control" divisions—one taught by a regular member of the high school staff, and one by the writer. In the "experimental" division, a technique developed by the writer was the means of teaching students how to attack exercises in geometry with assurance in their ability either to reach successful solutions or to detect and correct their own errors.

The abilities of these divisions were measured by tests in exercises. These tests were graded more objectively by the use of score cards, based upon the relative difficulty and correctness of the several parts of the proofs. The median achievements of the division using the experimental technique were significantly higher than those of either of the other divisions. However, the experimental technique showed a differential effect, in that it was markedly helpful to average students, of slight benefit to superior students, and detrimental to very superior students. Students using this technique looked upon the ideas of Book

* By Winona M. Perry. Teachers College, Columbia University, Contributions to Education, No. 179.

I as groups of principles functioning repeatedly in problem situations; they were active in their search for suggestions until successful in finding the "link" relations.

The difficulties which instructors considered students would probably face in the solution of a series of ten exercises in geometry, and the difficulties which students actually found in the solutions of the same exercises, are discussed in Appendix I. In Appendix II are given (1) five "matching tests" developed for the purpose of measuring ability to arrange, or to select and arrange, the reasons for steps stated in the proof of a single proposition; and (2) a multiple choice test to measure the range of information acquired. Directions for teachers in the use of these tests and the distributions of scores in each of the divisions precede each of these objective tests.

Differences in attitudes were apparent, but they were exceedingly difficult to measure. Although they were not determined scientifically, "more methods of finding solutions of a given exercise, more questions concerning related properties, more rapid responses accurately expressed, and more satisfaction in the group or individual study of geometry were characteristic" of the students who were using the experimental technique daily.

THE EFFECT OF TIME UPON VARIABILITY *

THE problem proposed for this study is: In what degree, if at all, is an individual more variable in his performance of mental work when the time interval elapsing between work periods is a variable ranging from a few minutes through a few hours, a half day, a day, several days, a week, a month, a semester to a year?

The method of the study is a comparison of coefficients of correlation obtained with shorter and longer time intervals upon the following data:

1. Army Alpha Intelligence Examination, Forms 6, 7, 8, 9, 5, Tests 2, 4, 5, 6, 7, written successively on alternate days (Sundays excepted) until each form had been twice written. Two groups of college students. ($N = 14$, $N = 16$.)

2. The Thorndike Intelligence Examination for High School Graduates. Normal school students tested for 3 hours one day with retest on other forms of the same test one year later. ($N = 170$.)

3. I.E.R. Tests of Selection and Relational Thinking, Generalization and Organization. Ninth grade students, 15 years old, tested for 2 hours; retested one year later. Two groups studied. ($N = 250$, $N = 250$.)

4. A test 9 hours in length, consisting of many sorts of work. Adults of non-college grade tested one day; retested a second day one week later. ($N = 20$.)

5. Thorndike Test of Word Knowledge. Grades 4-8, tested with Forms A, B, C, and D (rotated); retested with a different one of these forms ten days later. ($N = 35$, 58, 166, 190, 219. Total $N = 668$.)

6. I.E.R. Tests in Completions and Arithmetic. Grade 6 tested in forenoon, retested in afternoon of same day. ($N = 205$.)

7. Battery of tests extending over about a month's time, several tests writ-

* By Ella Woodyard. Teachers College, Columbia University, Contributions to Education, No. 216.

ten on given days. Retests at the end of a school semester approximately four months later. Grade 7. (N = 50.)

8. Tests in Handwriting. Same pupils as in (7) above tested forenoon and afternoon of the same day on four different days with intervals of 17, 14, and 67 days. Also tested once on each of two days 2 and 11 days after the second day's double testing. (N = 50.)

9. Tests in color naming. College students tested twice in succession, again twice later in the same four-hour work period each day for five successive days. (N = 19.)

10. Tests in Cancellation of 2's and 3's. College students (same individuals as in (9) above) tested in cancelling 2's, then in cancelling 3's twice during the same four-hour period for 5 successive days. (N = 19.)

The conclusions from the study are:

1. Individuals are variable in the amount of mental work they can produce under a specified set of conditions.

2. The amount of variability of individuals' performances may be of such magnitude as to change a coefficient of correlation (N = 19) from .60 to .91 in cancellation of 2's and 3's from the first half of an early period one day and the first half of a late period one day later; or from .67 to .87 in an hour's work in arithmetic (N = 20) against an hour's work in completion written the same day, the two sets being seven days apart; or from .49 to .69 when an easy reading test and a mixed relations test are compared, the two being written on days a week apart (N = 20); or from .46 to .63 when arithmetic problems are plotted against completions written in forenoon and afternoon of the same day (N = 205), the harder and easier halves of the two tests being interchanged; or from —.20 to +.29 when the Woody Subtraction test is plotted against a Vocabulary test. (N = 50.)

3. The lapse of time between tests is one factor in the variability of an individual's performance. This factor is, however, of small moment in estimating the total variability of an individual. The progressive variability with increasing lapse of time is slight if it truly exists at all. But little more difference between coefficients of correlation can be found after a year than after a week, and but little more after some days than after some hours.

The practical implications of these results are:

1. The important total problem of the variability of an individual in mental work is thus delimited by the determination of the effect of the time element.

2. This effect is so slight that it may suitably be given small weight or entirely disregarded in estimating the amount of variability.

3. In determining the reliability of a testing instrument, the time element is of small consequence. The repeat test may be given the same day, several days later, a year later, with but small difference in effect upon the results.

Further investigation suggested by this study should lead to the determination of the true causes of changeableness in individuals. Fatigue, distractions, motivation, and the like, are possible factors which may be investigated, but for which specific machinery would doubtless need to be set up. So great heterogeneity of material as used in this study would be extremely difficult to collect. Such researches would therefore need verification and extension to a degree greater than seems at all required for the present study.

THE EDUCATION OF FEEBLE-MINDED WOMEN *

THE researches upon which these studies of the education of feeble-minded women were based were made at the Laurelton State Village (formerly Pennsylvania Village) and covered a period of four years of intensive study.

The author first traces the history of the care and training of mental defectives from the earliest conception that feeble-minded persons would be able to comprehend all subjects ordinarily studied by normal people, provided the period of training were longer and the presentation of subject matter were of a special character, through the recognition of the fallacy of this idea and the insistence upon segregation for all mental defectives, to the present-day conception of confining segregation to those cases that cannot adapt themselves to extramural life and employing colonies and special classes for those mental defectives who are capable of partial or entire life outside of an institution.

The tests used in the study and their results present a number of interesting facts. For example, the comparison between the results of the Stanford Revision of the Binet Scale and the Performance Tests shows that, in general, the morons have a higher intelligence quotient in the latter tests; that the results of the imbeciles, as a rule, run *pari passu,* while the idiots fall below in the Performance Tests. May not these results form a scientific basis for the present empirical idea that vocational studies should have greater emphasis placed upon them in the curricula for special classes?

The necessity for evolving new methods of care and training for mental defectives is shown. To-day, if the work is to be practical, two distinct policies in education must be considered: one for the girls and women who must remain in the institution; the other for those who are to lead full or partial extramural lives. For the first group, the old type of training with slight modifications is sufficient; for the second group, the training and education should be as liberal as can be assimilated, in order that the members of this group may be equipped to return to outside life as economic assets.

The curriculum is planned from three angles: academic, industrial, and moral education. The emphasis placed upon each of these types of training depends upon the group under advisement. In arranging for any course of study three important factors must be taken into consideration. The individual herself, the individual in relation to the institution, and lastly the individual in relation to the community. The academic training must be of such character as to provide both self-protection and recreation. Every girl who leaves the institution must be able to read and interpret notices, warnings, etc., and also to amuse herself by spending part of her leisure time in reading. Her writing should be sufficiently legible to enable her to sign pay rolls, papers, etc. In addition, she may find recreation in writing letters. She must have sufficient knowledge of arithmetic not only to safeguard her wages and purchases, but also to prevent her from being imposed upon. Her vocational education must provide her with two trades, preferably not seasonal ones. This intensive training should render her

* By Mary Vanuxem. Teachers College, Columbia University, Contributions to Education, No. 174.

capable of being self-supporting. It should also afford her an opportunity for exercising her talents in dressmaking, millinery, etc., when she is not employed at her work. Probably the most important branch of education for the mental defective who is to live outside an institution is the moral one. The term "moral" does not mean sex morality alone, but includes the entire field of moral habits. Control in matters of sex, temper, gluttony, etc., the value of money, time, clothing, etc., must be learned. In addition the idea of group consciousness must be inculcated. Even though the candidate possesses the necessary requisites for extramural life along academic and vocation lines, but unfortunately lacks the proper moral qualifications, she is not considered competent to adapt herself successfully to the outside world. It must, however, be borne in mind that a higher standard of morals must not be set for feeble-minded persons than would be required of those who are normal.

In introducing the subject of academic education, it is pointed out that because the majority of those assigned to school work exhibit manual dexterity and also because there is a general dislike of school work, it is frequently wiser, in starting a pupil's education, to place greater weight upon vocational school training than upon formal school training. Perhaps one explanation of the dislike for school, which necessitates this program, can be found in the table showing a comparison of the mental ages of the groups studied with grades they supposedly attained in school. Surely this is a sad commentary on "courtesy promotions." Floundering beyond their intellectual depth as many of these girls must have been doing, would be sufficient to engender an intensive dislike of school work without taking into consideration other factors which aided in fostering this antagonism.

The following problems present themselves with regard to the organization of school work for adult defects: The difficulty of making the school attractive to the girls, the supercilious attitude of the girls themselves towards any further academic education, the inadequacy of both the ordinary elementary school curriculum and the methods applied in training defective children, the inadvisability of presenting the subject matter in the usual order, and the question as to whether the instruction should be group or individual. While these problems were being studied every effort was made to devise methods which would include the necessary fundamentals and yet conceal the fact that they were the former hated studies. The presentation of subject matter, the finding of suitable textbooks, and the adjusting of the size of the classes to the needs of the individual are then treated in this study. The table showing the results of the school work after these methods had been in operation for a year and a half is a convincing testimonial to the efficacy of the plans which were adopted.

The discussion of industrial education contains a number of new contributions to the education of mental defectives. The author begins by presenting the table of mental capacities of the feeble-minded as issued in 1910 by the American Associations for the Study of the Feeble-Minded. In contra-distinction, she then offers tables of mental capacities as ascertained during these intensive studies. The tables, covering every phase of institution life, state the minimal age at which each task can be accomplished satisfactorily and the number of days or

trials necessary to learn each task at the given mental age. These tasks range from the simple one of "fetching and carrying" under supervision, which can be done at a Stanford mental age of from one year to one year and eleven months and a Performance Test age of from one to two years, through various phases and types of domestic, farm and general work, to "general housework," which requires a minimal Stanford mental age of ten and a Performance Test age of thirteen to do this task absolutely unsupervised. Following these tables, the methods of obtaining the lowest mental ages, and of establishing definite units of measurements are given, and certain general principles applying to industrial education are laid down.

In the discussion on moral training it is pointed out that this is the most difficult problem in the education of feeble-minded women. Here much of the work must be destructive before it can be constructive. A cogent reason for this is that, while in the teaching of academic and vocational subjects a number of the habits to be acquired are more or less familiar and can be used as bases for further development, when the inculcation of moral habits is attempted it is usually necessary to forget old habits and form new ones often diametrically opposed to those practiced for years. The methods used and the results obtained in training low grade defectives to acquire good personal habits are interesting and instructive. The discussion of the establishment of proper ideals with regard to such characteristics as thrift, courtesy, truthfulness, honesty, sex morality, etc., opens a wide field for inquiry.

The part played in moral development by religious services and the kind of disciplinary measures to be used, with their effects, receives attention in this study. The disciplinary scheme finally evolved was a combination of the self-government methods used in the elementary and the high schools plus some of the rewards and ideals of the Girl Scout and the Boy Scout organizations. This system had been in operation almost three years at the time the book was written and has had the following results: It has aided in solving the disciplinary problems which arise in every institution; it has been a valuable asset in handling delinquent defectives; it has afforded opportunities for the growth of self-control along various lines; it has enabled the girl to grasp a more impersonal idea of administering punishment. This system, however, does not work satisfactorily in certain cases, but thus far it has been more efficacious in handling the disciplinary problems and in instilling specific principles of morality in the girls than any other method that could be found.

The subject of personality in its relation to the education of defectives also receives attention. A Personality-Work Sheet which can be used as a scale is presented. It is pointed out, however, that in the present state of knowledge of personality, no scale thus far devised can be considered absolutely accurate or entirely satisfactory. The author gives in tabular form comparisons of the effect of personality upon academic, vocational and moral education in girls of the same mental ages. The effect of worldly experience upon personality and its resultant effect upon learning is also touched upon. While this chapter is suggestive and the material composing it capable of further development, nevertheless it will require much more additional study before the results can be considered as absolutely conclusive. The kaleidoscopic changes in

personality and the many imponderables affecting these changes make scientific evaluation of the data on personality both treacherous and difficult. This chapter and the one on industrial education are, perhaps, the two most important contributions which the book can offer.

The author summarizes her findings as follows:

1. Recent studies and methods show that segregation alone will not control mental deficiency.

2. In testing, it is advisable to give more than one group of tests in order to secure the most reliable results.

3. In order to adapt the education of mental defectives to the present trend, it is necessary to plan one type of curriculum for those who must remain in the institution and another for those who are eventually to lead extramural lives.

4. Any satisfactory educational program for mental defectives must be based upon a scientific foundation.

5. The tables of industrial capacities heretofore used are not adapted to measuring the vocational ability of mental defectives who enter institutions as adults.

6. Moral training is the most difficult problem in the education of adult defects and can be inculcated best by a modified system of self-government.

7. No study of the training and education of mental defectives is complete without a discussion of the effect of personality upon the learning process.

8. In all probability the special training mentioned in the three fields of education can be given only to that girl who is socially minded. There is, however, only one ultimate test—train the girl, then place her in the outside world, and watch for results.

COLLEGE NEWS

THE PROFESSION HONORS DR. McMURRY

THE DINNER

AN editorial from the New York *Times* of July 24, 1926, says:

"The procession of those whom Dr. Frank M. McMurry has taught would probably be some hours in passing a given point in Fifth Avenue and of such personnel as to justify the suggestion that he has found 'a short way to immortality' in having trained many before whom similar processions might in the future pass, and so on *ad infinitum*."

At the Hotel Astor, New York City, on July 23, six hundred and fifty of these students and associates met to honor Dr. McMurry as he enters upon his sabbatical year previous to his retirement after twenty-eight years of service as Professor of Elementary Education at Teachers College.

The toastmaster of the occasion was Dr. Franklin T. Baker, the oldest professor, in point of service, at Teachers College. The other speakers on the program included Miss Roxana A. Steele, of the Western State Teachers College, Kalamazoo, Mich.; Dr. Frank P. Bachman, of the General Education Board of New York City; Miss Annie E. Moore, assistant professor of education at Teachers College; Dr. Lotus D. Coffman, president of the University of Minnesota; Dr. John W. Hall, of the University of Nevada, and Dr. James E. Russell, dean of Teachers College. Dr. McMurry responded briefly at the end of the program. His speech is reproduced on page 215 of this number of THE RECORD.

In addition to the guest of honor and the speakers, on the dais were seated: Mrs. McMurry, Dr. John Finley, on the editorial staff of the New York *Times*, Professor David Snedden, Professor R. J. Leonard, Professor J. Ralph McGaughy, Professor William H. Kilpatrick, all of Teachers College, and Mrs. Kilpatrick. Each guest was presented with a beautiful menu containing a portrait of Dr. McMurry, a copy of which is reproduced here.

THE SPEECHES

Below are given abstracts of the speeches at the dinner.

DR. BAKER

Our guest of honor, Frank Morton McMurry, has given to the cause of public education more than forty diligent, fruitful, inspiring years. In 1886, a youth of twenty-four, he set out for Germany, then the sacred parent of many forms of intellectual life. After three years of study at the Universities of Halle and Jena, with a Ph.D. from the latter, he returned for his career. In these thirty-seven years he has been teacher, administrator, lecturer, author. His life work spans the period when edu-

cation rose into that mingling of aspiration, optimism, philosophy and introspective psychology that is now a matter of history to our students, and reaches over into the classified, ordered scientific research of to-day.

Throughout this long period he has remained the same,—not in all his theories; no thinking man could—but in his clarity, his forceful directness, his intellectual honesty, his industry, in his devotion to the cause and to his ideals, and in his delightfully human attitude toward his colleagues and his students. He has known when to be exacting, when to be considerate; when to fight, and when to make truce. He has not known how to run away, or to shirk, or to betray a cause or a friend. As was said of another, "His integrity was perfect; it was a law of nature with him, rather than a choice or a principle."

So it is, naturally, to Frank McMurry the man, even more than to the thinker and teacher, that we colleagues and students of his are saying regretful goodbyes. We are, I hope, not to lose him altogether. But we cannot hope so often to hear his wise counsel, his moderation, his scorn of shams and futilities, his profound sanity of view.

His philosophy of life has been good for us because it is squarely based *on* life. His companionship has been prized, because he is so human. His success has been inspiring, because it is so well-deserved. And his honors have delighted us because they have been carried so modestly.

Miss Steele

The men and women gathered at these tables to-night have deeply enjoyed the spirit of fellowship strengthened by the bonds of memory. Each group has shared stories about Dr. McMurry as they know him. How fine it would be if we could now have the choicest ones which have been related. They would make a composite picture—alive and vital—of the man whom we are honoring this evening.

Our composite portrait of Dr. McMurry shows him as a kindly man with a cheerful outlook on life, a winning smile, and a rich, melodious voice.

Sincere—considerate of all specifically proposed activities and people.

Uncompromising — toward twaddle, time wasting, and self-deception.

Expectantly patient with the young and with the retarded or poorly endowed mature student.

Invigorating by his informal but certain advance in thought and in the chairmanship of his classes.

Colossally generous in his attitude toward the new.

Accessible by a happy lack of social insulation.

Critical—in the wider sense of the term.

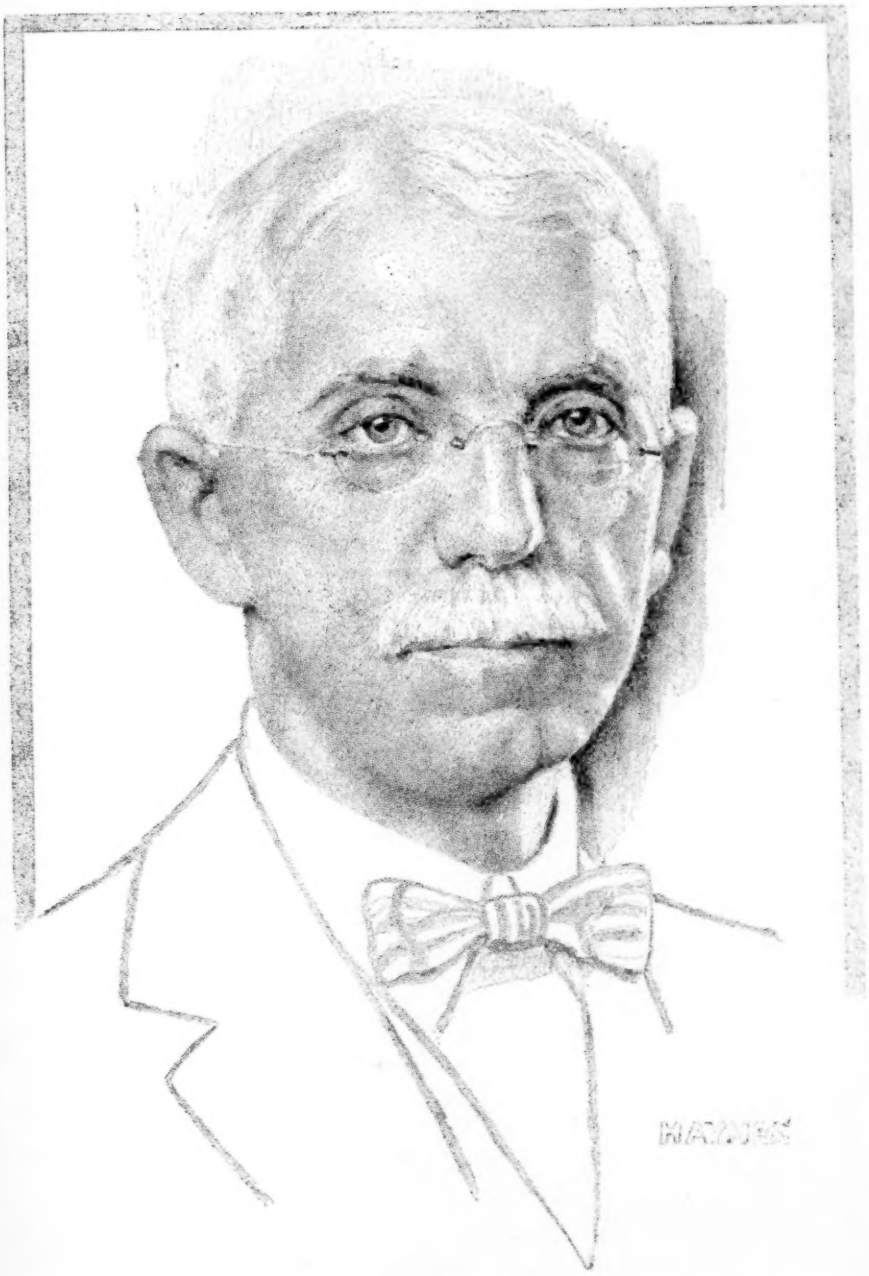
Dryly humorous—enjoying his own idiosyncrasies as well as the foibles of others.

Dr. McMurry has contributed much to his profession and his time.

His productive capacity has been fertile over a long period and distributed over the whole field of elementary school interests. *The Method of the Recitation, How to Study and Teaching Children How to Study, Elementary School Standards,* etc. Each of these is a milestone.

He has shown that elementary education contains problems in organization, supervision, and technique of instruction worthy of a life work.

He has influenced first-rate men



FRANK MORTON McMURRY

and women to make life enlistments in elementary education.

He has made incalculable contributions to the professionalizing of teaching.

He has encouraged original thinking if it had the merit of sincerity and truth.

He has discouraged discussions about plausible generalities in education by his own transparent candor and clear statements.

He has demonstrated that the friendliest kindness and democracy between a college professor and his students may be a wholesome relationship.

The real teacher will love those pupils best who learn most quickly to stand alone. That for him is the climax—the moment of graduation. Dr. McMurry has graduated many!

Dr. McMurry has a short cut to immortality through the fact that he lives in the lives and work of so many of his pupils. I know of no one who has done more for the cause of elementary education. In the name of the hundreds of teachers and children who have been influenced either directly on indirectly by you, Dr. McMurry, I salute you as a warm friend and a great teacher.

Dr. Bachman

My acquaintance with Dr. Frank McMurry spans a period of about thirty-two years. He was pointed out to me one day as no other than the new principal of the practice school of the Normal University, Normal, Illinois, the renowned Dr. Frank McMurry, holder of a Ph.D. degree from Germany, the best teacher in the school, who knew all that ever had been learned about good teaching or ever would be learned about good teaching. Years of acquaintanceship have intensified my first impressions, so I have always thought of Dr. McMurry as *the teacher*. A great teacher he always has been and a great teacher he always will be.

Others, like Dewey and James, have contributed to the philosophy of education; others, like Monroe and Graves, have contributed to the history of education; others, like Thorndike and Judd, have contributed to educational psychology and to tests and measurements; but McMurry stands almost by himself among university men in his devotion and his contributions to good teaching.

The educational world is a stormy world, swept all too often by passing fashions and isms. Even Dr. McMurry has not always been immune. Who here cannot remember his enthusiasm over "apperception," "correlation," "the five formal steps," "minimum essentials," "socialized education," but, with it all, unlike many others, his controlling interest has never changed. Although his song may have differed from time to time, his theme remained ever the same—good teaching.

Dr. McMurry's contributions to good teaching are not to be measured by his writings, though these are not unimportant. His principal written contributions are *Methods of Recitation,* written in conjunction with his brother Charles, and *How to Study*. His chief contribution to good teaching is, however, himself—his personality.

Rarely is a man's work and the man so closely identified—the one so direct an expression of the other. His teaching, itself his main contribution to good teaching, is but the expression of the simplicity of his character, his tolerance of mind, his inquiring spirit, his willingness to teach children and to learn by experience. His very teaching thus sym-

bolizes the heart and life of the man. To him teaching is the child and the teacher working quietly together, each learning from the other.

Professor Moore

We realize that it is impossible for any or all of us to convey adequately what Dr. McMurry has meant to the College and to the student body during these twenty-eight years. We shall end to-night with what Stevenson called "a negative exaggeration" for the things we should like to say and cannot for lack of transmitting power will bulk much larger than those which we shall be able to express.

Few men prominent in education have so consistently placed children at the center of their theory and practice. Dr. McMurry's early work was directly with boys and girls of elementary school age and he has at no time allowed himself to be cut off entirely from such contacts. Consequently his work has never been academic in character but has remained peculiarly vital and human.

Granting the importance of the measurement movement and of statistical studies in education, he felt no call to take up these lines himself but continued by means of public lectures, writing, and direct teaching to call attention to easily recognizable traits and needs of real children as we know them—at home, at school and elsewhere. He regards Mary and John not as certain dots in the upper or lower quartile of a curve of distribution but as young friends and neighbors, perhaps, or as individual members of a class in the Horace Mann School. Again and again in public discussion he has referred to children as interesting and stimulating companions to be valued for their own present worth as well as for their promise for the future. It has been Dr. McMurry's delight to teach boys and girls himself and whenever a good opportunity offered he seized upon it.

A philosophy of great simplicity is his and its expression is entirely free from affectation and verbosity. He has always insisted that if our ideas are sufficiently clear we can find adequate expression for them in plain everyday language. He has shown no disposition to coin a new pedagogical vocabulary and has often exhibited impatience when confronted with the educational cliche. One of the first to translate into practice the Dewey theory, he offered to the school world all that is soundest and best in the project idea before the term "project" had come into current use.

No one could be freer from a feeling of self-importance than Dr. McMurry, and his simple friendliness has made him easily approachable. His ready sympathy and genuine interest in others have called out the affectionate regard of all who have had the good fortune to know him. This sympathetic interest has found frequent expression in something more than cheering words. Many a confused and anxious soul has received from this big-hearted man just the practical help which saved from serious failure or loss.

Dr. McMurry has furnished the intellectual champagne for our department as well as a large measure of the steady food for thought. His withdrawal is as devastating to our spirits as the Volstead Act is designed to be to the convivial. We cannot for a long time, if ever, distil a vintage which will have the sparkle and the bracing quality which have characterized the McMurry brand.

As for his co-workers, we are not merely resigned. As the best possible

tribute to him we gird ourselves, and measuring our forces we plan to "carry on" right lustily, preserving as much as possible of the splendid spirit that has characterized the elementary department under the direction of our beloved Dr. McMurry.

President Coffman

One of the first books I read thirty years ago soon after I became a teacher, was McMurry's *Method of the Recitation.* Even before that I had heard of a small group of American educators who had received a part of their training abroad with certain German professors of pedagogy and who had returned to this country fired with an ambition and an impelling enthusiasm to improve teaching in America. One of the leaders of that group was Frank McMurry. From then until now he has devoted himself with a singleness of purpose to one thing, the training of better and still better teachers. Soon after he returned from Europe, in collaboration with his brother, he published *The Method of the Recitation.* Nothing like it had ever before appeared in the educational literature of this country. It was a bold, daring and original attempt to describe a plan of teaching that would insure interest and provoke thought among pupils. While it did not openly attack the mediæval methods which had hitherto prevailed, it was really a potent, active and constructive criticism of them.

This book early fell into my hands. I read it with great interest and profit. It gave me a point of view, as it no doubt did many another. It affected my thinking and modified my practice for many years.

My intimate association with Dr. McMurry dates from the time I became a student at Teachers College. By some means or other he became my adviser and after looking me over and making a careful inventory of my mental possessions, he advised me to major with some one else although he permitted me to enjoy a seat in his office. Occasionally he would bring in a paper or thesis that some student had written and that had been accepted by one of the professors as qualifying the student for an advanced degree with the question, "What does this mean?" Not infrequently after we had concentrated our combined mental effort on it, we reached the unanimous decision that so far as we could see it didn't mean anything. Then he would burst forth with the trenchant question, "Why don't these students write about something that will make a difference, that will modify practice." I was always a little apprehensive about that question, for my own thesis was several degrees removed from the theory of teaching.

But we got on amicably, for his was a lovable nature, until he gave me Education 10 to teach. Some of you may not remember it, but this course was a course which permitted the various members of the staff each to deliver a series of lectures on the teaching of his specialty. I listened to all these lectures with great interest and discomfiture, for I never heard so many diverse and conflicting points of view concerning education presented as were presented in that course. Then I knew why McMurry was not giving the course. There rested upon the one in immediate charge of the class, the responsibility of summarizing and of unifying these lectures so that the students might have a coherent point of view.

In my despair I visited the large class on "How to Study," which Dr. Mc-

Murry was teaching, with the hope that I would find a way out of my dilemma, and I did. I learned that the thing to do was not to agree with anything but rather to have a mind of my own. As soon as my guide and mentor had revealed to me the spirit of the College, I knew what to do. I waited until after my distinguished specialists had left the room and then I proceeded to demolish their theories and to present my own views—views which were at complete variance with those of every one else.

I did, however, learn several valuable things from Dr. McMurry's class. For years I had heard that one could not teach more than twenty or twenty-five pupils in a given class and I found many more—it seems to me a hundred and fifty students in his class. These students were observing model lessons and criticising them. Afterwards I discovered that the observation of these lessons was not of the perfunctory sort; on the contrary it called for a keen and critical analysis of the lesson procedure. But it was during the discussion of the model lesson by the class that I made the most amazing discovery; it was the discovery that a large class teacher could teach a large class.

Dr. McMurry's recitations did not proceed in the usual way. The professor did not ask a lot of more or less miscellaneous and general questions. In fact he seldom asked a question which he directed at any one and yet the whole method of the recitation was Socratic. The propositions or questions were put in a way that commanded attention and provoked thought. Students, not one but many, would almost instantly accept the challenge. All over the room they could be seen standing waiting to discuss the question under consideration. For once in my life I saw a recitation where every one was thinking and where he was ready and willing to contribute to the solution of some important problem in learning.

These recitations possessed another characteristic which I regarded as very significant. In spite of the interest and the amount of discussion, wandering from the point under consideration was never permitted. Usually it was held to easily but occasionally it required some penetrating remark from the teacher to bring the wandering minds back, and that remark was always ready. The teacher knew where he was going, he knew what he wanted, and he proceeded with unerring certainty to the goal he had in mind.

Dr. McMurry's attack upon traditional and current methods of instruction was as relentless as it was certain. He punctured existing theories with a neatness and despatch that made it impossible for them to be re-inflated and he left the advocates of time-worn theories too prostrate for recovery. And yet it was done in a way that created no ill-will or emnity. He convicted and convinced by the preponderance of the evidence, by piling case on case and illustration on illustration. He did not seek to persuade but rather to convince. Those who spoke or sought the privilege of arguing were always expected to support their arguments with logic and concrete materials that appealed to common sense and to reason.

Dr. McMurry's recitations possessed a uniqueness and an originality all their own. The master was always master of every situation. He met every crisis and disposed of every emergency in a convincing and effective manner.

Dr. McMurry held rigorously to the thought that education is not a matter of formal routine. Everything to him

contributed to one's education. According to his way of thinking one in acquiring an education was constantly engaged in choosing between relative importances. On one occasion he astonished his class at the opening recitation by saying, "I think this will be a rather idle group of students if you do not occasionally have something more important to consider than to come to this class." That was flying in the face of tradition and accepted practice, for the members of that class had been taught that regularity of attendance was virtue. Furthermore many of them had traveled hundreds and some thousands of miles to sit at the feet of this distinguished man and here he was telling them that they should sometimes find something more important than his work.

The fact nevertheless remains that few of them ever did find anything more interesting. They were present at the beginning of the hour and with great regularity. They were there because this man had aroused their curiosity. Day after day he shattered their traditions and shocked them into thought. At every recitation he disturbed their equilibrium and drove their minds into new and unaccustomed channels. He created mental disturbances for the sake of having problems to solve. He was a refreshing mental trouble maker. He did not try to cram the minds of his students with facts. In all my acquaintance with him I never heard him deliver a single lecture for the purpose of displaying information. Nor did I ever hear him assign a lesson which required the mere mastery of facts. He never pursued knowledge as a mere intellectual pleasure, for he knew that led to barren scholarship, to a profound ignorance of the spirit. He never sought knowledge for the sake of securing more worldly advantage, for he knew that would lead to biased and prejudiced judgment. He sought knowledge merely that he might teach others. How simple this statement and yet how much it connotes. He was not a scholar in the pedantic sense. His students did, however, find it necessary to read, to acquire information of a detailed and technical character to solve the problems he had raised in their minds. They even formed discussion groups that they might pursue further the consideration of the topics of the class and that they might be the better informed for the class discussions.

How frequently have we heard it said that the effectiveness of teaching is measured by the quantity of information presented. A person of vast learning who continually exposes that learning is a valuable addition to any faculty. How much more important is that teacher who sends his students on pilgrimages after knowledge! Dr. McMurry never failed to distinguish between these two things. Even when teaching college classes his thought and energy were concerned with the training of the thought processes of the pupils that were being taught. In his early years he gave attention primarily to the training of teachers as an important end in itself, but he soon turned from this to the important task of regarding teachers as intermediaries in training children to think. And he got the cues for all of his teaching from the children themselves, measuring the ultimate objectives to which the children should aspire from life itself.

Herein lies the great secret of his success. He possessed a philosophy of life and a philosophy of teaching. This is the reason why we assemble here tonight from near and afar to pay tribute

to this rare man. He has inspired thousands with his philosophy of teaching and he has sent them out over the earth imbued with the sublime thought that their chief mission is that of awakening, stimulating and directing the mental growth of their pupils, first by stimulating curiosity and wonder and then by creating a desire to learn the truth. No man of his day and generation produced so many disciples or sent out so many crusaders for better teaching than Dr. McMurry. He may retire from Teachers College but his influence will gather strength and determine progress wherever children are taught. We come to pay tribute to this master teacher—this man who at all times has been his own employer, an independent spirit, accepting the high opportunities that a life of teaching offers.

Dr. Hall

[Dr. Hall's tribute to Professor McMurry expressed in his inimitable way described his long years of acquaintance with Dr. McMurry, including the early days at Normal, Illinois, their close association abroad and especially his intimate relations with the McMurrys in their home.

Dr. Hall's speech added to the occasion a picture of Dr. McMurry's delightful human personality.]

Dean Russell

Professor McMurry's title to fame is secure. One of the first Americans to make the pilgrimage to the Jena pedagogical shrine—at that time the only place in the world which gave University standing to the study of elementary education—he brought back the aggressive by precept and example, from the platform and in his writings, for more than thirty years he has been the champion of the artistic technique of the classroom. How to study, how to learn, how to select and arrange material of instruction, how to supervise teaching, these are the problems to which he has given a life-time of study. The fruits of his labor have been passed on to thousands of students. Himself a great teacher he has been a living example of his creed. His broadmindedness, his freedom from cant, and his sense of fair-play have endeared him to his colleagues and made him a constructive force in the development of Teachers College. We of the old guard, staff and students, owe him a debt of gratitude which can be repaid only by continuing to carry on in his spirit the work to which his life has been dedicated.

TRUSTEES

By action of the Executive Committee of the Board of Trustees of Teachers College, Ruth Andrus, Ph.D. has been appointed, from and after July 1, 1926, assistant professor of education, with a seat in the Faculty of Education, and research associate in the Institute of Child Welfare Research.

The following scholarships and fellowships have been added to those reported in a recent number of The Record:

Isabel Hampton Robb Fellows

Gray, Carolyn Elizabeth (B.S. 1917, M.A. 1920 Columbia), Croton Falls, N. Y.

Patton, Augusta (B.A. Smith College, 1916), Westfield, N. J.

Darche-Kimber Scholar

Showalter, Lois (B.S. State Teachers College, 1922), Snowville, Va.

Mercy Jane Hayes Scholars

Lamb, Eunice Marguerite (B.S. Michigan State College, 1915), Clayton, Mich.

Wiegman, Grace, Lansing, Mich.

EDUCATIONAL ADMINISTRATION

Students registered in the first major course for superintendents of schools have begun their field work on a survey of the schools of Fort Lee, N. J. This inquiry is being undertaken at the invitation of the Board of Education of Fort Lee and is being directed by Professors Strayer, Engelhardt, Alexander and Mort.

Students in the second major course are making a survey of the schools of Nyack, N. Y. The Board of Education in this community believes that further school accommodations should be provided. One of the important issues to be settled by the survey is the type of school building which should be constructed and its location.

Professor George D. Strayer delivered an address on "The Scientific Approach to the Problems of Educational Administration" at the fiftieth anniversary of Johns Hopkins University, October 22.

The students registered in the courses for superintendents of schools, together with their wives and children, were the guests of the members of the staff of the department of Educational Administration at a picnic held on the grounds of the Horace Mann School for Boys on Saturday afternoon, October 2. Supper was served at the home of Dr. and Mrs. Strayer. One hundred and seventy persons were present. Everybody reports a most enjoyable time at this first meeting of the Administration Club for the current year.

Mr. Willard S. Elsbree and Mr. C. F. Borgeson have taken up their work as assistants in the department. They are rendering most valuable service in helping students to get acquainted with their work in the department and in giving instructions to groups organizing for participation in the field work now being undertaken.

The students in Educational Administration met on October 5 for the organization of the Administration Club for the current year. The following officers were elected: President, Dale S. Young; vice-president, Joseph Edward Gibson; secretary, Miss Florence Dillon; treasurer, Henry Rowland Halsey.

Professor Paul R. Mort spoke before the Teachers' Conference of the Third and Fourth Supervising Districts of Westchester County at Mt. Kisco on October 1 on the topic, "Teaching Boys and Girls as Individuals."

The educational press has commented very favorably upon the *Problems in Educational Administration,* prepared by Drs. George D. Strayer, N. L. Engelhardt, and others. The *Educational Review* of June, 1926, comments as follows:

> When the future historian of the public schools reviews the steps leading to reform, he'll cite this book as one of the vitally important events of the onward march.

A recent review in the *American Educational Digest* carries this paragraph:

> Dr. Strayer and his associates have here produced an invaluable guide for

> the scientific study of school administration. There is nothing else like it in breadth of range, directness of attack, definiteness of procedure, or fidelity to the principles revealed in the best educational practice. This epochal book is prophetic of a new era in which scientific principles will be intelligently and effectively applied to the ever-annoying problems of the school executive.

Superintendent Frank G. Pickell of Montclair, N. J., reviewing the book in the *Journal of Educational Research*, Vol. 14, No. 1, expresses himself as follows concerning it:

> Of the books on educational administration which have been written within the past ten years, this one is the most unique and most practical, and—mark the prophecy—it is the harbinger of a new kind of major training course for school administrators.

This problem book has gone into its second printing.

Dr. N. L. Engelhardt was one of the speakers at the meeting of the State Teachers' Association at Santa Fe, New Mexico, on November 4, 5 and 6.

During the Winter and Spring Sessions, special luncheons will be held each week at the Faculty Club for the first and second major groups of students in Educational Administration. The groups meet alternately on Mondays in a special luncheon room at the club. The luncheons are attended by the members of the staff and the student body and the occasion provides a special kind of opportunity for discussing problems of the profession.

A Plan Book for Elementary School Teachers, prepared by Drs. Strayer, Engelhardt and Mort, has recently been issued by the Bureau of Publications. In this book the authors have provided for the type of analysis which they believe every good teacher will want to make in preparation for teaching and which will serve a most important need in keeping track of the work which has been done. In addition to this record of plan, the book provides an elementary teacher's reading list, a list of professional periodicals for teachers in elementary schools, and a very comprehensive list of standard tests for elementary pupils, together with the grades for which these tests are designed and the places where the tests may be secured.

Following the practice of previous years, the administration luncheons were held each Monday during the Summer Session at the University Faculty Club on 117th Street and Morningside Drive. The third floor of the Faculty Club was set aside for these luncheons. All of the students in the major courses in Educational Administration were invited to these luncheons, attendance being limited by the capacity of the club. The luncheons were addressed by members of the staff in Educational Administration and members of the student body. It was a pleasure to have Dr. C. T. Loram, Commissioner of Native Affairs, Union of South Africa, and Dr. Frank P. Graves, Commissioner of Education of the State of New York, address the luncheons on different occasions. The attendance approximated two hundred at each of these luncheons.

Two recent additions to the Strayer-Engelhardt School Administration Series, published by the Bureau of Publications, are *Public School Janitorial-Engineering Service* by George F. Womrath, business superintendent of schools, Minneapolis, Minn., and *Estimating the Cost*

of School Equipment by Arthur K. Loomis, director of curriculum research, Denver Public Schools, Denver, Colo.

During the months of May and June Professor Mort studied the problems of pupil classification as they are being attacked in a number of mid-western cities. Rochester, Buffalo, Cleveland, Detroit, Highland Park, Chicago, Winnetka, Gary, St. Louis and Indianapolis were included in his itinerary.

Students in administration who during the Summer Session completed the university requirements for the degree of Doctor of Philosophy are as follows: Dr. I. M. Allen whose thesis covered "The Contractual Status of Public School Teachers"; Dr. E. W. Anderson, "Teachers' Contracts and Other Phases of Legal Teacher Status"; Dr. W. S. Ford, "Some Administrative Problems of the High School Cafeteria"; Dr. O. T. Hamilton, "The Courts and the Curriculum"; Dr. H. M. Schwartz, "The Improvement in the Maintenance of Public School Buildings." All of these studies are being published by the Bureau of Publications, Teachers College.

Professor Strayer spoke before the Berkshire County Teachers' Association at Pittsfield on October 8 on "Individuality in Education."

Professor Mort addressed the Teachers Welfare League of the State of New York at Syracuse on October 9 on "The Place of the State in Financing Public Schools."

ADVISERS OF WOMEN

Miss Harriet Hayes, dean of women of Southwestern Louisiana Institute, Lafayette, La., has been appointed instructor in the educational guidance of women and will assist Professor Sarah M. Sturtevant in the division of Advisers of Women and Girls for the year 1926-27.

Professor Sturtevant will attend the annual meeting of the Kansas State Deans' Association held at Emporia on November 2 and 3. The plans for the conference have been worked out on a most practical and interesting basis, and provide for a series of study groups, each one stressing a particular phase of the problems confronting advisers of women and girls. Professor Sturtevant has been asked to lead these discussions. She will also address the College Section of the Kansas State Teachers' Association, which will meet at Topeka and Chanute.

Miss Jane L. Jones, who has for the past year been assisting Professor Sturtevant and completing her work for the Doctor's degree in this field, has been appointed exchange instructor in the School of Education, Edinburgh University, for the coming year. Her particular interest is in the higher education of women, her Doctor's thesis being a study of certain phases of college education for women in this country.

On the evening of September 30, the members of the major group in Advisers courses were entertained informally by Professor Sturtevant. It was revealed in the course of the evening that many of the class this year are active deans and social workers in many fields. They thus bring to the course a rich background of practical experience. At the close of the evening the Advisers' Club was organized for the year with the following officers: President, Miss

Martha Quayle, adviser of women and Y.W.C.A. secretary at the University of Hawaii; vice-president, Miss Eva Mooar, formerly director of the Appointment Bureau at Radcliffe College; secretary, Miss Mildred Fischer, of the Pennsylvania State Department of Education; treasurer, Miss Agnes Thornton, last year head of residence in one of the halls at the State Normal School, Mount Pleasant, Mich.

Miss Theresa Scudder is the newly appointed dean of women at Winthrop College, Rock Hill, S. C.

Miss Mary McLean has accepted the position of dean of women in the West Texas State Teachers College, Clarendon, Tex. Miss Elizabeth Reed will have a similar position at the Buffalo State Normal School, Buffalo, N. Y. Both Miss McLean and Miss Reed received their appointments a year ago and were sent by their schools to Teachers College in order to secure special preparation for their work.

Miss Marie Wilson goes as assistant dean of women to Miami University, Oxford, Ohio. She will have the rank of assistant professor and director of training for recreational leadership.

Miss Victoria Frederick and Miss Genevieve Cooley will be members of the staff of advisers at the North Carolina College for Women, assisting the dean of women, Mrs. Sue S. Durand.

Miss Nora Power is acting dean of women at the Southwestern Louisiana Institute, Lafayette, La., for the year 1926-27.

Mrs. Esther McDonald Lloyd-Jones, who for two years has been director of personnel work for women at Northwestern University and who assisted Professor Sturtevant during the past Summer Session, is spending the year at Teachers College specializing in the study of the education of women.

Miss Edith J. Stauffer, dean of girls of Bronxville High School, Bronxville, N. Y., and chairman of the National High School Deans' Association, attended the meeting of the International Federation of University Women which met in Amsterdam the latter part of July.

Miss Maude Schaffer has returned to her position of dean of women at State Teachers College, Fresno, Calif., after studying in this field at Teachers College last spring and spending some weeks in Europe, during which time she attended the summer school at Oxford University.

Miss Eunice Nelson is now dean of women at the Louisiana Polytechnic Institute, Ruston, La.

EDUCATIONAL SOCIOLOGY AND VOCATIONAL EDUCATION

During June Professor David Snedden gave a number of addresses at each of the following summer school centers: Brigham-Young University at Provo, Utah; Wyoming State University at Laramie, Wyo.; Colorado State Teachers College at Greeley, Colo.; Colorado Agricultural College at Fort Collins, Colo.

Professor Snedden addressed the Four State Vocational Conference, held August 24-27 at West Chester, Pa.

During June Professor Daniel H. Kulp made an extended trip to British Columbia, Vancouver, Seattle, and other cities in the Pacific Northwest, studying hospital organization and nurses training schools. On his return he lectured in the University of Montana, Missoula, on sociology and on social work.

Dr. Kulp attended the annual meetings

of the Society for Social Research, held at Chicago August 23-27, and conducted a round table in educational sociology on "Methods of Determining the Content of Educational Sociology for Normal Schools." On September 9 Dr. Kulp participated in the City Teachers Institute, Trenton, N. J., and made addresses on the following topics: "Personalizing Education," "Toward Understanding the Problem Pupil in the Junior and Senior High Schools," "Toward Understanding the Maladjusted Child in the Elementary Grades."

The Educational Sociology Club from the surplus of 1925-26 voted $125 toward providing the sociology laboratory in Lowell Annex with motion picture equipment for research purposes.

ELEMENTARY EDUCATION

Professor J. R. McGaughy addressed the elementary teachers of Trenton, N. J., public schools on the afternoon of September 8, and the teachers of Monmouth County at Long Branch, N. J., on the forenoon of October 4.

For the past six months Professor McGaughy has been acting as director for the Citizens' Committee on Teachers' Salaries. A very careful and detailed study of the whole teacher salary situation in New York City has been made under his direction. A series of proposed schedules to be recommended for adoption by the Board of Education and the Board of Estimate has recently been made public by this Citizens' Committee.

In June Professor Milo B. Hillegas spent a week lecturing at William and Mary College and another week at the Western Reserve University. Dr. Hillegas was one of the speakers at the Institute held October 4 in Jacksonville, Fla.

Professor William A. McCall gave a series of lectures during June to the students of the Alabama Polytechnic Institute and to various organizations in or near Auburn, Ala.

Two additional books of the Standard Test Lessons in Reading series, prepared by Professor McCall, Dr. Lelah M. Crabbs, and Teachers College students, have just been published by the Bureau of Publications, Teachers College. These two books are for use in Grades V and VI or above.

Professor Lois C. Mossman spent two weeks in the National Summer School of Logan, Utah, at the State Agriculture College. On September 2 and 3, Professor Mossman did institute work in the Parker District, Greenville, S. C., a mill district partly encircling Greenville, with a school population of six thousand mill children. From September 5 to 10 she taught at the Southwest Texas Teachers Institute in San Antonio, Tex.

On October 7 Professor Mossman went to Macomb, Ill., for the day to visit the State Teachers College where she taught before coming to Teachers College. On October 8 she spoke before the Military Tract Teachers Association in Galesburg, Ill.

Miss Emma B. Grant spoke at Northampton, Mass., October 22, before the Teachers' Institute. Her first lecture was on "Practical Visions in Elementary Education" and the second on "The Science of Phonetics in Primary Grades." Miss Grant is giving a series of lectures on "Criteria for Evaluating Good Teaching" to the Brooklyn Association of Home Economics Teachers at the Allerton Hotel, New York City.

FINE ARTS

Professor Charles J. Martin's intersession course in advanced painting was given at Provincetown, Mass. The usual enthusiastic group made good use of the picturesque material afforded by this seaside fishing town.

Courses in both "Prints Appreciation" and "Print Making" will be given under Professor Martin this year.

The summer school conducted by Professor Grace Cornell completed its third successful year at South Bristol, Me. Among the student body, which numbered eighty-four, were persons of varied occupations,—teachers, designers, artists, and business men—from many localities throughout the United States. Miss Kate Mann Franklin and Miss Grace D. Ely, two former Teachers College students, were instructors at the school. An exhibition of landscape sketches by the school will be given at the Rotary Club.

Professor Cornell addressed the Eastern District of the Home Economics Association at the Museum of Arts, New York City, October 14, on "Design and Its Use." Professor Cornell is also giving a series of lectures on "Design and Color" at Pratt Institute, and has resumed her lectures at the Metropolitan Museum of Arts.

Mr. Albert Heckman conducted a class in painting during the summer at Woodstock, N. Y., the well-known art center in the Catskill Mountains. The class had a full registration of twenty-five students whose time was profitably and enjoyably spent in intensive study of landscape painting.

Miss Elise Ruffini is studying painting under André L'Hote at the Academy of Modern Art in Paris.

Mr. John P. Heins is in Europe for an indeterminate stay. At present he is painting landscapes in Piana, Corsica, but later intends to continue his work in Paris.

Miss A. Fraser Fulton spent part of the summer painting in Gloucester, Mass.; Miss Pauline Blake made lithographic drawings and painted at Provincetown, Mass.; Miss Belle Northrup studied and worked in Texas and California.

Mrs. R. R. Treganza will broadcast through station WEAF on Wednesday mornings throughout the year a series of talks on interior decoration. This work is sponsored by the Home Study Department of Columbia University.

The Garden Magazine and Home Builder has featured three articles on interior decoration by Mrs. Treganza. These articles appeared in January, April and August of the current year.

FOODS AND COOKERY

During the past summer Professor May B. Van Arsdale lectured at the Euthenics Institute at Vassar on the "Scope of Modern Cookery."

Miss Anna Barrows is expected to resume her lectures at the College about December first.

Miss Dorothy E. Shank, formerly instructor in Investigation Cookery, has accepted a position as director of research with the American Stove Company. Her office is in Cleveland. Miss Ina Padgett, a former student, has been appointed to succeed Miss Shank.

Miss L. Millicent Yackey began her work with The Better Housekeeping Department of the *Ladies Home Journal* on June 1.

Mrs. William Cain, formerly Bernadine Champion, is part-time instructor in household arts for the current year.

Miss Bertha Campbell, formerly assistant in household arts, is directing the lunch room and instructing in cookery at Hunter College.

HISTORY

Professor J. Montgomery Gambrill gave a series of five lectures at the State Normal School, Towson, Md. This series of lectures is the third given at the normal school through a visiting lectureship made possible by an alumnæ fund. The title of Dr. Gambrill's course was "Our Changing World and Its Civic Problems." The lectures dealt with the dramatic development of an age of science, the revolutionary changes which it has wrought in our modern world, the growth of a world community, the new and difficult problems of democratic government, and the civic and educational problems of a rapidly changing world.

HORACE MANN SCHOOL

Among the changes in the personnel of the teaching staff of the Horace Mann School for the current year are the following: Miss Jean Steele takes charge of the music in the High School in place of Mr. Gerald Reynolds, who has resigned. Miss Steele is a graduate of Mount Holyoke and last taught music in the public schools of Mount Vernon, N. Y. Miss Grace Reeves returns to the High School to resume her work in the household arts department, after a year's absence in Japan. In fine arts, Miss Dorothy Wilkinson, from California, will take the place of Miss Lillian Prentiss, who has resigned. Miss Zola Thurston will teach a second grade in place of Miss Mildred Batchelder, who was married in July to Mr. Charles R. Richards. Miss Ida E. Robbins, teacher of the fourth grade, retired last May from active service, after teaching most efficiently in the Horace Mann School for thirty-six years. Miss Sara Baldwin takes the place in the third grade of Miss Nellie Jacobs, who resigned to accept a position in the Jamaica Normal School. Mr. Lloyd Sharp will have general supervision of the recreation clubs, taking the place of Mr. David K. Brace, who has been appointed professor of physical education in the University of Texas.

Among the part-time assistants for the year are Miss Ann Revere, dramatic coach; Miss Muriel Leach, physical training; Miss Dorothy Mathews, mathematics; Mrs. Clara Turner Zyve, open-air classes; Miss Laura C. Dixon, grammar grade assistant; Miss Beatrice Davis, intermediate grade assistant; Miss Bess Rush, primary assistant; Mr. William S. Larson, director of orchestra; Mrs. Winifred Brubacker, high school assistant. Miss Lucy Weiser, in charge of the industrial arts in the elementary school, has been granted a leave of absence for the first half-year. Her work will be carried on by Miss Madge J. Burgard, assisted by Miss Henrietta Purnell.

Professor Henry C. Pearson, principal of the Horace Mann School, has been appointed a member of a survey commission to investigate the Andrews Institute for Girls at Willoughby, Ohio.

HOUSEHOLD ARTS EDUCATION

Professor Cora M. Winchell recently spoke before "The Contemporary" of Newark, N. J., on "Education's Response to the Challenge of the Changing Home." On October 25 and 26 she

attended a conference on Parental Education held at the Merrill Palmer School, Detroit, Mich.

Word comes from Professor Anna M. Cooley that she is enjoying her sabbatical leave traveling in France, Switzerland, and Italy. Miss Cooley is accompanied by Miss Edna Booth.

Miss Geraldine Hadley, of Arsenal Technical High School, Indianapolis, Ind., Miss Adah Hess, supervisor of home economics, Illinois, and Miss Gertrude Warren, of the office of Cooperative Extension Work, Washington, D. C., were members of the Household Arts Education staff during the Summer Session.

Professor Wilhelmina Spohr is giving an extramural course in Household Arts Education for the teachers of Elizabeth, N. J., during the Winter Session.

HOUSEHOLD ECONOMICS

Professor Benjamin R. Andrews will speak before the New York State Teachers Association at the convention of the Western District to be held in Buffalo, November 4 and 5. On November 22 he will speak at the annual meeting of the Association to Promote Better Housing for Girls in New York City.

Professor Andrews gave the opening address at the Wilkes-Barre City campaign for Child Welfare at the Y. M. C. A. building, Wilkes-Barre, on the evening of October 16. His address was on the subject of "Housing and Child Welfare." On the same day he addressed the Kingston, Pa., High School, and the Quota Club of Wilkes-Barre.

Professor Ernest R. Groves, of Boston University, lecturer on social and economic problems of the home in the Summer Session of Teachers College, has just issued, through Houghton Mifflin Company, a volume entitled *The Drifting Home.*

HOUSE MANAGEMENT

Mrs. Lillian Gilbreth, who is cooperating with the graduate groups in House Management in promoting further study on the application of scientific management to the household, was one of the prominent speakers at the International Congress of University Women held at Amsterdam, Holland, last July. Mrs. Gilbreth also gave a talk on "Fatigue Elimination" at a meeting of Industrial Engineers in Switzerland.

One of the Summer Session instructors in House Management, Miss A. Grace Johnson, has returned to her work at Oregon Agricultural College, Corvallis, in the department of household management, and is equipping and starting a new house to be used as a center for a home laboratory. This is the third, great emphasis being placed there on the value of these household management home houses.

Professor Emma H. Gunther was one of the speakers at a meeting of representatives of college clubs of Smith, Radcliffe, Mt. Holyoke and Wellesley, held at Holyoke on October 2. At this meeting of the Connecticut Valley Branch of the Association of University Women, a report of the International Federation at Holland was given by President Comstock of Radcliffe, a talk on "The College Women of the Orient" by President Woolley of Mt. Holyoke, while others emphasized some of the experi-

ments under way on questions relating to homemaking as well as studies on the economic status of women to-day.

From the director of the Euthenics Institute held at Vassar this summer comes the statement that a significant relationship was shown between management with its schedules of work and the child in the home, many of the mothers having had little realization of the close linking of one with the other. This work was presented in Household Technology by Mrs. Gladys Beckett Jones, formerly of this staff.

Mr. Philip Youtz, lecturer in House Planning at Teachers College, had the unusual opportunity this summer of being the one who directed a large group of college students in Europe on the study of architectural features of certain houses visited. Their visits included a special study of houses in old Chester, England, as well as some in France and Switzerland.

Following the visit last year of Miss Ruth Whittaker, director of Gloucestershire College of Domestic Science, England, one of her students, Miss Evelyn Hale, comes on a fellowship this year, stressing nutrition and household management as her major interests.

A bulletin is in preparation from a conference held on Home Management Houses, and it is expected from the press soon. It includes not only a digest of various contributions made on practice houses and home laboratories at this conference, but also a list of the many places throughout the country which are now using these home houses for their management laboratories. The bulletin will be published by the Bureau of Publications, Teachers College.

LINCOLN SCHOOL

The Lincoln School has added a number of new members to its staff. In the high school, Mr. George H. Perrine, a graduate of Hamilton College and more recently a student in France and Germany, will teach French and German; Mrs. Florence M. Baker, of the Winnetka public schools, will teach French; and Miss Josephine Walker, who took her Master's degree at Columbia University last year, will teach Spanish. Mr. Benjamin Stolper, of the Central High School, Newark, N. J., and Mr. Ernest Hanes, of the University of Chicago High School, Chicago, are new teachers in the English department. Mr. Mark H. Coyne comes to the art department from the University of Chicago. Mr. O. E. Underhill, of the science department, comes from the State Normal School of Salem, Mass.; Miss Nell Robins, physical education, comes from the State Normal School, Bowling Green, Ky.; and Miss Dorothy Tolleson, recreation clubs for girls, comes from the George Peabody College for Teachers, Nashville, Tenn. Miss Anita Laton, biology, comes from the University of California. Mr. Charles Mueller, of Columbia University, is a part-time teacher in history.

In the elementary school, Miss Avah Hughes, formerly of the City and Country School, New York City, will teach the first grade; Miss Edna Bridge, of the State Normal School, Montclair, N. J., will teach one of the fourth grade groups.

Miss Eunice Whipple, assistant in health and school activities, is a graduate of the Presbyterian Hospital, New York

City, and more recently was in personnel work in one of the large department stores.

Miss Helen Brown, Miss Rose Davis, and Miss Lois Meier, all graduate students in Teachers College, are new research assistants.

Five educational internes have been added to the staff: Miss Emily Curran, a graduate of Simmons College, Boston, in household science; Miss Katharine Debevoise, of Wellesley College, in mathematics; Miss Emily Thomason, of the Sam Houston Teachers College, Texas, in music; Mr. Lawrence Utter, of the State Normal School at Geneseo, N. Y., in mathematics; and Miss Mary Yabroff, of the University of Nebraska, in English. A full report of the plans for work by the internes will be presented in a later issue of the *Teachers College Record*.

Several members of last year's staff have taken positions elsewhere. Dr. Daniel C. Knowlton is assistant professor of visual education in the School of Education, Yale University; Miss Genevieve Collins is head of the department of physical education for women at the George Peabody College for Teachers, Nashville, Tenn.; Miss Caroline Zachry is teaching in the Montclair Normal School, at Montclair, N. J. Dr. Matthew Willing goes to the University of Wisconsin as associate professor of education; Mr. W. C. Gorham, to the State Normal School at Buffalo, as head of the department of biology; Dr. A. D. Whitman becomes assistant professor of education at New York University. Professor Albert Cru, who last year divided his time between the work in French in Teachers College and the Lincoln School, is now giving his entire time to Teachers College.

The tenth annual week of conferences of members of the staff of the Lincoln School was held on September 20 to 24 inclusive. The program of conferences is given below:

Monday: Reports of the educational experiences of those who were appointed to study and travel in Europe during the past summer. Those so appointed are Miss Coffin, Miss Holz, Miss Barry, Mr. Francis, and Mr. Sperry.

Tuesday: First Period—An outline by Mr. Tippett of his proposed plan for preparation of the comprehensive descriptive volume upon the work of the elementary division of the Lincoln School. Second Period—The Arithmetic Investigation, Miss Haley; The Geometry Investigation, Dr. Clark; The Creative Music Investigation, Mrs. Coleman.

Wednesday: First Period—"A Determination of the Major Problems of American Life," Mr. Hockett. Second Period—"A Proposed Volume upon Ten Years of the Lincoln School," Mr. Abraham Flexner.

Thursday: First Period—"A Study of the Permanence of Learning in Chemistry," Mr. Glenn. Second Period—"The Purposes and Methods of the Lincoln School," Dr. Rugg.

MATHEMATICS

On November 4 Professor C. B. Upton will speak at Rochester, N. Y., before the New York State Teachers Association on "The Future of Arithmetic in the Junior High School Grades."

Professor W. D. Reeve will speak on December 8 before the teachers of mathematics of Grand Rapids, Mich., and on December 9 before the Detroit Mathematics Club on the subject of the "New Curriculum in Mathematics."

MUSIC EDUCATION

The registration in the Music Education courses shows a steady increase over preceding years. The most noticeable gains have been made in the field which was opened last year, that of instrumental music. This involves elementary and advanced classes in the technic of orchestra and band instruments, elementary and advanced orchestra practice, methods of teaching instrumental music, a demonstration class, and a seminar on problems of instruction.

In addition to the two regular orchestras of Music Education students, there is a period for orchestra practice which is open to students and faculty of Teachers College without fee. This group consists not only of players who have had previous instruction, but beginners who receive class instruction in connection with their practice hour.

Other new courses given this year include music appreciation, general supervision, conducting and score reading, and institutional music, the latter devoted to the use of music as a correctional, educational, and therapeutic agency.

The Teachers College glee clubs and chapel choir opened the year with a large enrollment. These consist of the clubs for the men and the women meeting separately one day in the week and in combination the other day.

The major programs in Music Education have this year been increased to three. Beside the teaching of school music and the supervision of school music, there is now one having to do with technical programs and special aspects of music education. This may be in vocal or instrumental music, or in theory and composition. Unusual opportunities for this work are offered through affiliation with Institute of Musical Art.

The following instructors and assistants are giving courses in Music Education: Professor Peter W. Dykema, Miss Alice E. Bivins, Mr. Glenn Gildersleeve, Mr. M. Louis Mohler, Mr. Kenneth F. Damon, Mr. Norval L. Church, Dr. Willem van de Wall, Mrs. Lu Marion Mahood, Mr. Jesse Scott, and Mr. William S. Larson. The instructors in the Institute with whom the Teachers College students have most of their theory are Mr. George A. Wedge, Miss Helen Whiley, Miss Belle Soudant, Miss Dorothy Crowthers, Mr. Howard Murphy, and Mr. Howard Talley.

A weekly convocation of Music Education students takes place Wednesdays at 12. In addition to singing and announcements there is each week a short address in a fourfold series. These are presented by members of the Music staff, by members of the general Teachers College faculty, by outstanding musicians of New York City, and by the students themselves.

Other events of the opening month included a lecture recital by Professor Charles Sanford Skilton, of the University of Kansas, assisted by Winifred Young Cornish, pianist, of New York City. The subject of American Indian music was illustrated by songs, native Indian drum, flute and transcriptions for the piano.

The first banquet of the Music Education students was held at the Men's Faculty Club early in October. In addition to short addresses by members of the faculty, more extended talks were given by Dr. Frank Damrosch, director of the Institute of Musical Art, and Professor Walter Henry Hall, of Columbia University.

The formulation of the music course of study for the Horace Mann School, which was made by the Music Education staff of Teachers College, is now available for former Music Education students. This gives in considerable detail the work for the first six grades. In each grade the divisions are made along four lines of approach—appreciation, song singing, technical study, and playing upon instruments.

During October, Professor Dykema attended the series of invitation concerts given by the department of music of the Congressional Library of Congress; spoke before the New York State Teachers Association on "The Expanding Field of Music Education"; and before the National Recreation Congress at Atlantic City on "Music and Recreation."

NATURAL SCIENCE

At the Philadelphia Meeting of the American Chemical Society Professor S. R. Powers reported before the Education Section on his study of the terminology of high school chemistry textbooks. Professor Powers has recently been appointed chairman of a committee of the American Chemical Society to study the problems of education in chemistry in colleges.

Mr. E. D. Heiss, who was assistant in Natural Science in 1925-26, is now on the staff of the State Normal School, Milwaukee, Wis., in charge of the work of training teachers of general science.

NORMAL SCHOOL EDUCATION

Professor E. S. Evenden is on leave of absence for the Winter Session. He is studying some of the problems of higher education and of the professional education of teachers in England and on the Continent.

Professor Thomas Alexander returned in September after eight months spent in studying the teacher training institutions of Germany, Austria, and Sweden.

Mr. Clyde M. Hill, one of last year's associates in normal school education, completed his work for the doctorate in July. He has resigned the presidency of the Southwest Missouri Teachers College and is now an associate professor of secondary education in Yale University.

Miss Margaret Stroh, also one of last year's associates, is head of the English department in the State Normal School at Glassboro, N. J. Her work for the doctorate was completed during the Summer Session.

Professor William C. Bagley delivered an address at the convocation of the University of the State of New York on October 29.

Mr. Robert M. Steele, who completed the work for the doctorate during the Summer Session, has accepted the principalship of the State Normal School at Clarion, Pa.

Among recent publications of former students in normal school education are *Classroom Tests* by Dr. Charles Russell (published by Ginn and Company) and *Beginning Teaching* by Dr. J. E. Avent (published by the author, University of Tennessee, Knoxville).

NURSING EDUCATION

Several new members have been added to the departmental staff. Miss Helen

Boyd (A.B. Radcliffe, A.M. Columbia), graduate of the Johns Hopkins School of Nursing and recently director of the course in Public Health Nursing in Iowa University, comes as lecturer in the division of Public Health Nursing.

Miss Mary Marvin (A.M. Columbia), graduate of the University of Minnesota School of Nursing and recently assistant professor in Simmons College, Boston, has been appointed as part-time instructor in the division of Teaching and Supervision in Nursing Schools, giving half of her time also at Bellevue Hospital School of Nursing as director of Clinical Teaching and Supervision.

Miss Mary Power (T.C. student, 1925-26), graduate of the Massachusetts General School of Nursing, returns as part-time instructor in the division of Administration and Teaching in Nursing Schools.

Miss Elinor Lee Beebe (A.B. Fairmont College, Kansas), graduate of the Massachusetts General School of Nursing, has been released from her position as assistant in the American Red Cross, Division of Home Hygiene and Care of the Sick, and will assist as part-time instructor in the divisions of Public Health Nursing and Teaching of Home Nursing and Child Care.

Miss R. Louise Metcalfe, part-time instructor last year, becomes instructor and departmental secretary on full time.

Miss Amelia Grant, a former member of the staff, is giving two courses in the department, one in Public Health Nursing and the other in Clinic and Dispensary Nursing.

Dr. Frank Pedley, assistant professor in the department of Public Health Administration, College of Physicians and Surgeons, has been appointed as lecturer in Industrial Hygiene.

Dr. Alton S. Pope, assistant professor of epidemiology, College of Physicians and Surgeons, will assist Dr. Emerson in the course in Public Health Administration.

The following members of the staff took part in state and national meetings during October:

Professor Elizabeth Burgess and Miss Lillian Muse attended The New York League of Nursing Education meetings in Binghamton, October 27 to 29, the former as president and the latter as chairman of the Round Table on Examinations.

Professor Lillian Hudson attended the meetings of the American Public Health Association held in Buffalo, October 11 to 14.

Professor Isabel Stewart gave a paper at the meetings of the Tennessee State Nurses Association held in Knoxville, October 10 to 12.

The first meeting of the Nurses Club for the year 1926-27 was held September 30. After a pleasant social evening, during which Miss Stewart addressed the group, a business session was held, and the following officers elected: President, Miss Clara Quereau; vice-president, Miss Alma E. Foerster; secretary, Miss Ruth Fletcher; treasurer, Miss Augusta Patton; and chairman of the Social Committee, Miss Verda Hickcox.

There are 374 students registered in Nursing Education for the Winter Session; 149 of these are full-time students, and 225 are taking part-time work. The largest group is the Public Health group with 229 students, while the Teaching in the School of Nursing group has 79,

Administration 31, and Supervision in School of Nursing 35.

The public health nurses of Elizabeth, N. J., have organized an extramural class in Public Health Nursing with a registration of 33 members. Miss Helen Boyd will be the instructor for this course.

Approximately 200 of the New York City Board of Health Nurses have registered for a special series of lectures to be arranged for by the department of Nursing Education this term. Several nurses from the Board of Health staff have also joined the regular College class in Public Health Nursing given on Monday evening at 99 Park Avenue, New York City.

The following are a few of the recent appointments of former students in Nursing Education:

Miss Adelaide Mayo (A.M. 1926) as superintendent of nurses at the Nassau Hospital, Mineola, L. I. Miss Josephine Valentine (1926) as assistant superintendent of nurses, and Miss Helen Wicker (B.S. 1926) as instructor at the same hospital.

Miss Clara Brown (1926) as superintendent of nurses at the Henry Heywood Memorial Hospital, Gardner, Mass.

Miss Margaret Carrington (A.M. 1926) as superintendent of nurses, Miami Valley Hospital, Dayton, Ohio.

Miss Elizabeth Ross (A.M. 1926) as superintendent of the Olean General Hospital, Olean, N. Y.

Miss Ruth Wood as director of the Maternity Center Association, Brooklyn.

Miss Louise Muller (A.M. 1926) as supervisor of the Psychopathic Department, Philadelphia General Hospital, Philadelphia, Pa.

PHILOSOPHY OF EDUCATION

Professor and Mrs. William H. Kilpatrick sailed for Europe on October 28. They are making brief stops in England, Vienna, Athens, Greece, Constantinople, Syria, and Egypt, and intend rather extended stays in India and especially in China. They will be in China from about February 1 until the summer of 1928 and will return to the west coast of America in early August. A letter received from Professor Kilpatrick, written on board ship just before he landed in England, reported a smooth sea and "All fine thus far."

Miss Marion Y. Ostrander, Dr. Kilpatrick's assistant in the department, is spending this year in Beirut, Syria, as secretary to the Dean of the Medical School of the American University in that place. She expects to be in that position until July 1, 1928, and then to travel until early September when she expects to be back in her position at Teachers College.

Miss Ruth Allen (Colorado College, 1926) is acting as assistant to Professor R. B. Raup in the department during the absence of Professor Kilpatrick.

PHYSICAL EDUCATION

Professor Gertrude K. Colby spent the past summer travelling in Europe. While the trip was planned primarily for rest and pleasure, she took advantage of the opportunity to join the party of Dr. Thomas Alexander in Germany for the purpose of visiting schools in several of the Rhine cities. Professor Colby found much interesting work there, showing the new trend of thought in physical education, still influenced, however, by pre-war ideals. The party also visited the Hygiene Exposition at Düsseldorf.

Professor Jesse F. Williams lectured at the Carbondale (Pa.) Institute, which was held August 30 to September 3.

Mr. John Dambach, formerly director of physical education, Toledo public schools, has been appointed instructor in physical education for 1926-27.

Miss Emily Andrews has been appointed part-time instructor to present Danish gymnastics in the advanced work of the department.

Dr. David K. Brace has taken up his new duties at the University of Texas, and reports very favorably on his new position.

RELIGIOUS EDUCATION

The Summer Session of the Religious Education department offered seven courses this year, an increase of one over last year. There was also an increase in the number of students, from seventy-five last year to one hundred and thirty-two this year.

One interesting phase of the summer's program was a course specially designed for workers in Daily Vacation Bible Schools, into which were admitted scholarship students, undergraduates, who were recommended by various denominational mission boards. The scholarships in each case included two points of work at Teachers College and field work under supervision in approved centers, with excursions to institutions of child welfare, social agencies, and the like. The experiment was so successful that it will in all probability be continued as a part of the summer program.

The department was fortunate in having on its Summer Session staff Dr. W. C. Bower, professor of religious education of Transylvania College, Lexington, Ky. Dr. Bower is now at the University of Chicago in the same capacity.

Professor Adelaide T. Case attended the meeting of the council of the World's Student Christian Federation at Nyborg, Denmark, in August. Representatives from all over the world were in attendance, five men and five women coming from the United States. Dr. Case is on leave for the Winter Session to work on material for publication.

Mrs. Marion LeRoy Burton has been appointed leader of Religious Organizations for Teachers College, and is affiliated with the Religious Education department. By her long years of experience and close contact with student life on the campus, Mrs. Burton is well equipped to be an advisor for the student religious organizations. She is the wife of the late President Burton of the University of Michigan, who also was president of the University of Minnesota and of Smith College.

Mrs. Dorothy Dickinson Barbour has published a book which is the result of extended study and experimentation in applying the project method to Bible study. It is primarily intended for use in work with adolescents in China. The title is *Desired Bible,* and is published by the China Christian Educational Association.

Miss Elizabeth Harris has published a new study course for juniors in religious education. It is *Friends of the Caravan Trail,* and is a study of Mohammedan people and religion. It is published by the Friendship Press.

Miss Faye H. Klyver is professor of educational psychology and dean of women at Kalamazoo College. Miss

Klyver assisted during the summer in the Religious Education department of Teachers College.

Miss Helen Carnine is associate director of religious education at Irwin, Pa.

Miss Louise Kroeker is community director of religious education at Lonaconig, Md.

Miss Katharine Butler is on the staff of the National Student Council of the Y. W. C. A. for the South.

Mr. Otto T. Gilmore is student counsellor for students at Brown University.

Miss Lois Kugler is conducting the large Women's Bible Class at the Park Avenue Baptist Church, New York City.

RURAL EDUCATION

Professor Mabel Carney, who has been on a sabbatical leave in Africa for the past seven months, has printed an account of her trip in informal letters for students and friends. Former rural students in the field who desire a copy of this report may procure one upon request.

The Rural Club has organized for the year with the following officers in charge: President, George W. Rosenlof, University of Nebraska; vice-president, Grace E. Petty, State Teachers College, Maryville, Mo.; secretary, Josephine Murray, Santa Monica, Calif.; and treasurer, W. F. Hall, Booneville, Ark. The program of activities for the first semester includes three illustrated lectures on Africa by Miss Carney to be given in Horace Mann Auditorium on October 19, November 16, and December 7. In addition to these lectures several social affairs and excursions are being arranged, including a bus trip to Wilton, Conn., where the department is now engaged in a demonstration project in rural school supervision; an all-night trip to the markets of New York; and an Acquaintance Party.

The Rural Club was active during the recent Summer Session, and among other activities arranged a trip to the City Markets and an illustrated lecture by Mrs. Marie Turner Harvey, of the State Teachers College at Kirksville, Missouri.

Nine candidates for the Doctor's degree are now working under the auspices of the department. Three, Allan Hulsizer of New Jersey, and C. S. Huang and Y. C. Li of China, are in residence this year. The other six are out in the field, but are continuing their writing *in absentia.* These include Effie Bathurst, State Teachers College, Madison, S. D.; Edna M. Marshall, Normal School, Salisbury, Md.; W. J. McKee, University of North Carolina, Chapel Hill; Mamie McLees, Normal School, Trenton, N. J.; William M. Robinson, Bureau of Education, Washington, D. C.; and Walter Vance, Normal School, Glenville, W. Va. In addition to these nine candidates now at work, two others, A. S. Blankenship, State Teachers College, Commerce, Tex., and J. L. Hypes, Agricultural College, Storrs, Conn., passed their final examinations for the Doctor's degree in August. Their dissertations, which will soon be available through the Bureau of Publications, Teachers College, are on "The Accessibility of Rural Schoolhouses in Texas" and "Rural Social Contacts in Lebanon Township, Connecticut."

The course in Rural Sociology is being given this year by Dr. Edmund deS. Brunner, director of town and

city surveys of the Institute of Social and Religious Research, New York City. Dr. Brunner offered the course also during the past Summer Session.

Speaking engagements by instructors in the department for the fall include addresses by Professor Fannie W. Dunn before the State Teachers Association in Missouri at Warrensburg and Maryville, October 15 and 16; and before the New York State Teachers Association in Albany on October 22. Similar engagements for Professor Carney include the Indiana State Teachers Association, October 21 and 22; and the Missouri State Teachers Association in Kansas City, November 11 and 12.

Former students of Rural Education in the vicinity of Washington, D. C., are planning a reunion at the time of the National Country Life Conference to be held under the auspices of the American Country Life Association November 10 to 14. The Country Life Club of Teachers College also will send student delegates to this meeting and will take an active part in the organization of student programs for the conference.

SECONDARY EDUCATION

During June Professor Thomas H. Briggs lectured in Oklahoma before each of the State Teachers Colleges and before the students of education at the State University.

Professor Briggs is serving as a member of the committee appointed by the Civil Service Commission to select a member of the Board of Examiners for the New York City Schools.

Professor Briggs is a member of the committee appointed by the Department of Superintendence to prepare the *Fifth Yearbook*. This year it will be devoted to the curriculum of the junior high schools. Professor Briggs has undertaken responsibility for the section on grammar.

Professor Elbert K. Fretwell spent Saturday, September 11, at the George School, George School, Pa., advising with the principal, Mr. George A. Walton, and members of the faculty, and with the school committee, in regard to the organization of the school's extra-curricular activities. In the evening he presented to the whole group certain proposals for improving still further the work of the school in this field.

On September 3, at Swarthmore, Pa., Professor Fretwell met with the sales force of the circulation department of the Curtis Publishing Company to discuss with them the relation of their work and that of public high schools.

On October 7 and 8, Professor Fretwell spoke to the State Teachers Association of Minnesota in the meetings at Moorhead and Crookston, and to the State Teachers Association of North Dakota at Fargo.

On Saturday afternoon, October 9, the annual Secondary Education department picnic was held on the heights west of the Horace Mann School for Boys. After games and supper, the new students and the faculty became acquainted over the camp fires. The committee of arrangements were: Miss N. L. Woodruff, of Kentucky; Mr. George C. Wells, of Oklahoma; and Mr. F. W. Elson, of Michigan.

Professor Franklin W. Johnson is giving an extension course to the high school teachers of Reading, Pa., preliminary to a reconstruction of the cur-

ricula of the junior and senior high schools in that city.

In *School and Society* for July 31 appears Professor Percival M. Symonds' "Methods of Investigation of Study Habits."

In the *English Journal* (12: 244-257) Mr. C. C. Certain has a report on "The Briggs English Form Test in Use."

During the summer the Houghton Mifflin Company published *Curriculum Problems* by Professor Briggs, and Ginn and Company published a revised edition of the Briggs, McKinney, and Skeffington's *Junior High School English, Books I and II.*

The September issue of the *Oklahoma Teacher* contains, as an argument for the educational amendment which is presented this fall to the voters for ratification, an article on "Education as an Investment" by Professor Briggs.

In the major course for the preparation of High School Principals there are this year three representatives from Korea, one from the Philippine Islands, one from the Virgin Islands, and one from China.

During the Summer Session the following men served as assistants in the department: To Professor Briggs: Principal Leon C. High, Hazelton, Pa.; Principal Curtis H. Threlkeld, Des Moines, Ia.; Principal Matthew P. Gaffney, Aberdeen, S. D.; Principal Ralph W. McGill, Maywood, Ill. To Professor Johnson: Principal Truman G. Reed, Wichita, Kans., and Mr. G. Derwent Baker, St. Louis, Mo. To Professor Fretwell: Principal M. C. Wagner, Wilmington, Del.; Dr. Raymond G. Drewry, University of Southern California.

Professor Douglas Waples, of the University of Chicago, was guest instructor in the department during the Summer Session. He gave the courses usually offered by Professor Woodring, who spent the summer in Europe.

Professor Maxie N. Woodring spent the summer visiting secondary schools in Germany and Austria. The program of visitation included Hamburg, Berlin, Dresden, Leipsiz, Jena, Weimar, Vienna, Karlsruhe, Bonn, Cologne, Essen, and Düsseldorf. The early part of the summer was spent in East Germany and Austria, visiting classes in the experimental and traditional schools. This experience included such schools as the modern Lichtwarkschule, an Oberschule at Hamburg; the Kaiser Friedrich Realgymnasium and Aufbauschule, and the Französiches Gymnasium at Berlin; the Realgymnasium with Studien Anstalt at Leipsiz, where the modern pedagogical teachings of Gaudig are exemplified; the Albrecht Dürer Realgymnasium, an experimental school, at Dresden; Trais-Kirchen State Realgymnasium (*Bundeserziehungsanstalt*), a military training school before the war, now maintained by Austria as a boarding school for boys.

After the closing of schools in East Germany and Austria observations were made in the secondary schools of the Rhineland, which remain in session until the first of August. The oustanding schools visited in this section were the Reform Realgymnasium at Karlsruhe; the Oberlyzeum with Studien Anstalt, a modern school for girls, at Bonn; the Frauenschule in Cologne and Essen, which are attempting to adjust the education of women to the new social conditions in Germany.

In addition to actual classroom visita-

tion Professor Woodring enjoyed the special privilege of attending an *abitur*, the leaving examination of boys going from the gymnasium to the university; of participating in a special conference of practice teachers; and of accompanying a group of secondary school pupils on an excursion. Conferences with officials, directors, and teachers added much to the data assembled in the classrooms on the methods of teaching in the secondary schools of Germany and Austria. The summer's work closed with a visit to the *Gesolei*, an exhibition on hygiene, social welfare, and physical training at Düsseldorf.

Students enrolled in Education 235K, Directing the Study of High School Pupils, are making investigations of study problems in the Horace Mann School for Girls. This work is being carried on under the direction of Professor M. N. Woodring and Dr. Cecile White Flemming, psychologist at the Horace Mann School.

TEXTILES AND CLOTHING

Mrs. Evelyn Tobey spoke at the meeting of the Rhode Island Teachers Association in Providence on October 28. Her subject was "New Trends in the Teaching of Clothing." Mrs. Tobey will lecture to the business girls of the Harlem Branch of the Y. W. C. A. on "Dress for the Business Woman."

On October 28 Miss Lillian H. Locke spoke at the Normal School, Framingham, Mass., on current clothing problems. She also spoke before the Middlesex County Teachers Convention, held at Boston, Mass., on October 29. Her subject was "How Three Garments Have Changed Education."

Miss Esther M. Cundiff is writing a series of short articles on children's clothing for the new magazine, *Children*.

Two addresses of particular interest to students of Textiles and Clothing were given during October at Teachers College. One was on Textile Economics, by Mrs. Mary S. Woolman, of Boston, and the other on "Textile Legislation," by Mr. W. H. Humphries, formerly of the Massachusetts Institute of Technology, and now secretary of the National Wool Manufacturers Association.

VOCATIONAL GUIDANCE

On November 11 Dr. Harry D. Kitson addressed the Social Service Department of the Free Synagogue in New York City. On November 18 and 19 he will attend the meeting of the Louisiana Teachers' Association at Alexandria where he will give several addresses on vocational guidance.

The members of the Teachers College Branch of the National Vocational Guidance Association have been invited to attend several meetings of the New York City Chapter of the Association during the winter. The membership of the group is now sixty-four. At a business meeting held October 13, 1926, Miss Zerita Schwartz of Chicago was elected Secretary-Treasurer to fill the unexpired term of Eldon L. Usry of Columbus, Ohio, deceased.

A recent speaker before Dr. Kitson's class was Dr. Mary H. S. Hayes, Director of the Vocational Service for Juniors of New York City. Dr. Hayes described the work of her organization and offered opportunity for a number of qualified students to assist in making analytic studies of occupational openings for

juvenile workers in New York City. The opportunity was eagerly accepted by fifteen members of the class.

One of the new students in vocational guidance this year is Miss Ruth Welty, assistant psychologist in the United States Civil Service Department at Washington. In connection with her dissertation, Miss Welty is carrying on an investigation in the measurement of vocational interests.

Mr. E. Raymond Wilson has been awarded the Japanese Brotherhood Scholarship for the year 1926-27. Mr. Wilson will spend the year in Japan, where he will study student life.

A number of officers who hold positions in the international and local Y.M.C.A. and Y.W.C.A. are enrolled in the courses in guidance and personnel in the College this winter. These are evidences of a new policy in these associations, a policy which regards their mission primarily as that of guidance.

HOWARD O. ROCKS

The many friends of Mr. Howard O. Rocks were shocked to learn of his death at Warren, Ohio, on September 1. During most of last year Mr. Rocks had suffered severely from some obscure illness which the most expert diagnosticians had been unable to locate. In spite of almost constant weakness and sometimes acute pain, he smilingly carried on throughout the academic session, meeting the classes which he was teaching, attending lectures in Teachers College, and bringing to a successful conclusion a study which was to be his Doctor's dissertation. He seemed to have improved in health during the June intermission and entered upon a summer session's teaching in the Albany State Teachers College with much enthusiasm. At the conclusion of his work in Albany, he underwent a tonsillectomy at Warren, Ohio, and it was the complications resulting from this operation which caused his death.

Mr. Rocks was born in Cleveland, Ohio, October 8, 1885, where he spent his boyhood and youth. After attending the Moody Bible Institute in Chicago, he married Miss Maude Langdoc. Both Mr. and Mrs. Rocks studied at Culver-Stockton College, Canton, Mo., and received their Bachelor's degree from that institution. While engaged in the active work of the ministry of the Disciples of Christ, Mr. Rocks taught for four years in the Canton Public High School and in summer sessions of Culver-Stockton College. In 1923 he entered Teachers College for graduate study and received the Master's degree in 1925. Mr. Rocks' field of special interest was the history of education, which he made his major subject. For the two years preceding his death, he taught undergraduate classes in the History of Education in Teachers College. The subject of research to which a great part of his energy had latterly been devoted was the operation of the pauper education law of Pennsylvania, which was first passed in 1802 and later re-enacted in improved form. During the summer this work was completed, but time was lacking for the final oral examination for the doctorate.

Mr. Rocks had expected to take up this fall his new duties as registrar and professor of education in Culver-Stockton College, and there can be no doubt that his death interrupted what promised to be a most useful career as a college

teacher and executive. His ability as a stimulating instructor of college students had been proved, and his sympathetic personality, his progressive attitudes on religious problems, and his fine character would have made of him a vital moral force in any college community.

Mr. Rocks is survived by his wife, Mrs. Maude Langdoc Rocks, who at present is living at Momence, Ill.

ALUMNI ACTIVITIES

THE TEACHERS COLLEGE ALUMNI ASSOCIATION
OFFICERS

President: Mr. ZENOS SCOTT, Superintendent of Schools, Springfield, Mass.
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Field Secretary, Teachers College, New York City.

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TO ALUMNI OF TEACHERS COLLEGE

AN INVITATION

The Alumni Association is the bond that unites you with Teachers College. Your membership in the Association entitles you to ten numbers of the *Teachers College Record* and to membership

in your local Teachers College club. Moreover, it will enable you to maintain your connection with your college and to receive notices of important events. Your alma mater invites you into membership and you owe it to yourself to accept her invitation. Send your dues ($2.50) to the Alumni Secretary, 525 West 120th Street, New York City, or join through your local club secretary.

TO THE LOCAL CLUBS

My dear Secretary:

At the beginning of another year of college the Alumni Association greets you. The past year has been very successful for the local Teachers College clubs in many ways. Several new clubs have been given charters and several more are in the process of formation. We welcome them all.

Some of the clubs have done excellent work in membership campaigns for the Alumni Association and we appreciate their efforts. Others, we regret to say, have not been heard from. We feel that they are missing an opportunity to bring together in a very tangible way Teachers College and her alumni. Every new member you obtain for the Alumni Association is a new member for your club. Of the $2.50 dues which you collect, you send $2.20 to us and keep thirty cents for your club. Anyone who has ever attended Teachers College is eligible to membership in the Alumni Association and we depend upon you and your club to help us increase.

The Teachers College Record is sent each month for ten months to all members of the Alumni Association. We are glad to publish in the alumni columns of *The Record* any news items of professional interest. We depend upon you to send us news of your members and to urge them to send us news of themselves and their Teachers College friends. Send us also brief reports of your club meetings, giving principal speakers and any important details. Others would like to hear what you are doing. It is only through the assistance of those in the field that we can make the alumni news interesting.

Many of you have had faculty members speak at your club meetings in the past and you as well as others look forward to having them this year. Send us the approximate dates of your meetings far enough in advance so that we can send you a speaker, if possible. If we know that a member of the faculty is to be in your vicinity we will write you so that you can arrange to have a meeting if you care to. If you hear one is to be near you at the time of your meeting, write us and we will arrange to have him with you.

In short, we need your help and you need our help in order that both the Alumni Association and the local clubs may function to the utmost.

With cordial greetings to all the local clubs, I am

Sincerely yours,
Katherine I. Sherwin,
General Secretary

MISS STONE GOES TO ST. LOUIS

Miss Virginia Stone has been appointed director of Elementary School, Community School, St. Louis, Mo. Miss Stone, who is a graduate of the State Normal School at Farmville, Va., received the B.S. degree from Teachers College in 1920 and the M.A. degree in 1922. She taught first in the grades in various cities in Virginia and later became critic teacher at the Normal School at Farmville. From 1911 to 1916 she

was supervisor of the Training School at Fredericksburg, Va., and for the next two years supervising principal of the training school of Winthrop College, Rock Hill, S. C. In 1921 Miss Stone became principal of the training school of the State Normal School at Towson, Md., and in 1924, principal of the elementary department of the Scarborough School, Scarborough, N. Y.

MR. STEELE, PRINCIPAL OF CLARION STATE NORMAL SCHOOL

Mr. Robert M. Steele was appointed last spring principal of the State Normal School at Clarion, Pa. Mr. Steele's educational service has all been in Pennsylvania, with the exception of a year with the army. He taught in the high school at Clarion from 1908 to 1912; the following two years he was principal at the high school at Latrobe, and from 1914 to 1920, superintendent of schools at Latrobe. During the war he served as superintendent of instruction with the United States Army Educational Corps in Germany. Since 1920 he has been director of training at the State Normal School at Shippensburg. Mr. Steele received the Ph.B. degree from Bucknell University in 1908 and the M.A. degree from Teachers College in 1925. He has completed all the requirements for the doctorate, the title of his dissertation being *A Study of Teacher Training in Vermont.*

MISS ROBINSON TO CONDUCT EXPERIMENT IN PARENT EDUCATION

Miss Clara Robinson has gone to the School of Education, Cleveland, Ohio, as director of Parent Education, and will conduct a three-year experimental study in the field of parent education. Miss Robinson brings to this work a wealth of experience in education. She received the degrees of B.A. and B.Ped. from Syracuse University in 1913, the M.A. degree from Teachers College in 1923, and has nearly completed the requirements for the Ph.D. degree. Miss Robinson taught in the grades in various New York towns for a number of years and in 1913 became dean of women at Wyoming Seminary, Kingston, Pa. From 1916 to 1920 she taught educational psychology and elementary subjects in the Teacher Training School at Montpelier, Vt., from 1920 to 1923, educational psychology at the State Normal School at Shippensburg, Pa., and the following year at the State Normal School at Potsdam, N. Y.

JOHN J. RICHESON GOES TO YOUNGSTOWN, OHIO

Mr. John J. Richeson, for the past five years superintendent of schools at Decatur, Ill., has resigned his position to become superintendent of schools at Youngstown, O. Mr. Richeson is a graduate of Ohio University, having been granted the degree of B.Ped. in 1910. He received the degree of M.A. from Teachers College in 1921. After several years of teaching experience in Ohio, Mr. Richeson was appointed superintendent of centralized schools in Westville, O., in 1900. In 1905 he accepted a similar position in Lees Creek, O. In 1920 Mr. Richeson became professor of rural education at Ohio University, and in 1924 he was appointed dean of State Normal College of the same university. From there he went to Decatur, Ill.

J. A. MacKNIGHT IN GUATEMALA

Mr. J. A. MacKnight has accepted appointment as principal of the American Academy in Guatemala to begin work in January. Mr. MacKnight is a graduate of the Normal College at Stanberry, Mo., and received the M.A. degree from Teachers College in 1907. He is a candidate for the Ph.D. degree. For a number of years Mr. MacKnight was in Peru, first as inspector of schools and later as president of the Men's Normal School at Lima. Since 1917 he has been in business in New York City and has continued his graduate study at the same time.

IRA M. ALLEN GOES TO HIGHLAND PARK

Mr. Ira M. Allen has resigned his position as assistant professor of education in the College of Education at Chicago University to accept appointment as superintendent of schools at Highland Park Mich. Mr. Allen received his B.A. from Lawrence College in 1896 and his M.A. from Teachers College in 1924. From 1896 to 1917 he was principal of the high schools in Kaukauna, Wis., Kankakee, Ill., Wichita, Kans. and Springfield, Ill., and from 1917 to 1923 was superintendent at Springfield. Mr. Allen's dissertation for the Ph.D. degree was accepted during the summer. The title is *The Contractual Status of Public School Teachers.*

ALUMNI NOTES

Ruby Howe (M.A. 1925) is in her second year as social director of Betsy Barbour House, University of Michigan, Ann Arbor, Mich.

Thomas C. Bittle (M.A. 1924) is principal of Thomas J. Stewart Junior High School, Morristown, Pa. and supervisor of all junior high school work in the city.

Peter A. Lanese (M.A. 1925) is teaching shop work in public school 156, Brooklyn, N. Y.

M. R. Trabue (Ph.D. 1915) gave a series of four lectures in May before the California Educational Research Association and taught educational measurements and advanced statistics at Stanford University during the summer quarter.

M. Edith Geesey (M.A. 1925) was dean of women during the summer in the State Normal School at California, Pa. She is now teaching English, history, and civics in Haverford Township High School, Brookline, Philadelphia.

Ella M. Cushman (B.S. 1925) is clothing specialist at Cornell University, Ithaca, N. Y.

J. Cayce Morrison (M.A. 1916, Ph.D. 1922) has resigned his position as professor of school administration, Ohio State University, to accept appointment as assistant commissioner for elementary education, New York State Department of Education, Albany, N. Y.

Ernest R. Caverly (M.A. 1926) is principal of Drury High School, North Adams, Mass. He was formerly director of English in Newton, Mass.

Louise E. Arildson (B.S. 1923) is in her second year of teaching at the Spring Garden School, Nutley, N. J.

Hirsch Loeb Gordon (M.A. 1926) has been elected superintendent of the United Hebrew Schools of Newark, N. J., for a term of three years, where he intends to introduce the project method according to the plans he has outlined in the recent issue of the Hebrew educational bi-monthly "Shelilei Hahinuk," New York City. He has been elected secre-

tary of the American Association of Jewish Academicians. The Bloch Publishing Company, New York City, has just published his biography of his father, entitled *Rabbi Elijah Gordon, His Life and Work,* containing among other things a description of Jewish education in Russia for the last century.

F. T. Struck (M.A. 1914, Ph.D. 1920) has resigned his position as director of the Vocational Bureau of the State Department of Public Instruction to accept appointment as professor of industrial education and head of the Department of Industrial Education at the Pennsylvania State College. Dr. Struck was an instructor at Pennsylvania State College 1918-1920 and since then, while he has been connected with the Vocational Bureau of the State Department of Public Instruction of Pennsylvania, has taught during summer sessions at several state colleges. He is the author of *Construction and Repair Work for the Farm* (Houghton Mifflin Company, 1925); *Farm Shop Work in Pennsylvania,* published in bulletin form by the Pennsylvania State College, 1919 and *Part-time Co-operative Industrial Education,* Bulletin No. 1, Pennsylvania State Department of Public Instruction.

Miss Grace Crosby (B.S., 1924) has been appointed and has begun the year at the Francis Parker School, Chicago, as teacher of history and English in the junior high school.

ALUMNI APPOINTMENTS

The following appointments have been announced by the Bureau of Educational Service, Teachers College.

Adams, Sarah G.—Special teacher of grades four, five, and six, Montclair Public Schools, Montclair, N. J.

Allen, T. M.—Superintendent of schools, Highland Park, Mich.

Allen, Marie L.—Teacher of English, High School, Sebring, O.

Angel, Gladys—Supervisor of physical education, Public Schools, Superior, Wisc.

Arneson, Ruby—Supervisor of art, Normal School, Slippery Rock, Pa.

Arnold, Mary E.—Teacher of art, Toledo Museum of Art, Toledo, O.

Asadian, H.—Primary supervisor and instructor, Indiana Central College, Indianapolis, Ind.

Atkins, W. C.—Head of biology department, Battin High School, Elizabeth, N. J.

Atkinson, Mattie M.—Director of physical education, Central High School, Chattanooga, Tenn.

Bain, L. C.—Teacher of mathematics, High School, Bronxville, N. Y.

Baker, Florence W.—Teacher of French, Lincoln School, New York, N. Y.

Baker, Frances L.—Primary supervisor, State Normal School, Eau Clair, Wisc.

Ballew, Zula—Teacher of English and advisor, Miss Hockaday's School, Dallas, Tex.

Banta, Helena C.—Teacher of drawing, Junior High School, Hackensack, N. J.

Barger, Edith—Teacher of geography, Wilson Normal School, Washington, D. C.

Barnett, Carrie—Instructor in American history, High School, Tulsa, Okla.

Becerra, Rafael A.—Instructor in Spanish, State College of Washington, Pullman, Wash.

Beiswenger, Anna J.—Teacher of technique in intermediate grades, State Normal School, Bellingham, Wash.

Bender, John F.—Professor of school administration, University of Oklahoma, Norman, Okla.

Bigelow, Edwin L.—Union superintendent, Manchester District, Southern, Vt.

Black, Lois—Instructor in Spanish and French, Winthrop College, Rock Hill, S. C.

Bomar, Willie—Instructor in home economics, East Carolina State Normal College, Greenville, N. C.

Bottum, Helen—Supervisor of First Grade, Minnesota Normal College, St. Cloud, Minn.

Boyington, Gladys—Supervisor of social studies, North Carolina College for Women, Greensboro, N. C.

Brame, Annie—Teacher of mathematics and science, Phebe Anna Thorne School, Bryn Mawr, Pa.

Bray, Ethel—Director of art, Public Schools, Washington, D. C.

Brewer, Anne T.—Supervisor of seventh and eighth grades, Oswego State Normal and Training School, Oswego, N. Y.

Brisac, Edith M.—Assistant to head of art department, The Principia, St. Louis, Mo.

Brooks, Clara H.—Teacher and supervisor of first, second and third grades, Harvey Day School, Greenwich, Conn.

Bruckheimer, Mildred S.—Instructor in health education, Slippery Rock Normal School, Slippery Rock, Pa.

Brunt, William L.—Head Master, Lancaster High School and Academy, Lancaster, N. H.

Buell, Mary—Instructor in foods, Illinois State Normal University, Normal, Ill.

Buck, George S.—Principal of Simsbury High School, Simsbury, Conn.

Burnham, John—Instrumental instructor, State Normal College, Ypsilanti, Mich.

Butterweck, Jos. S.—Assistant professor of education, Temple University, Philadelphia, Pa.

Byrne, Lee—Head of department of urban education, Northern Teachers College, Aberdeen, S. D.

Cape, Jane—Instructor in home economics, Antioch College, Yellow Springs, O.

Cates, Winifred W.—Supervisor of grammar grades, Public City Schools, Greenville, S. C.

Cathcart, Margaret Scott—Teacher of fine arts, Junior High No. 3, Elizabeth, N. J.

Caverley, Ernest R.—Principal of Drury High School, North Adams, Mass.

Clark, Dorothy—Instructor in physical education, Senior High School, Hazleton, Pa.

Clark, Grace M.—Director of intermediate group, Cumberland Valley State Normal School, Shippensburg, Pa.

Clark, Hazel M.—Social director and instructor in education, State Normal School, Frostburg, Md.

Codella, Lucy—Teacher of Spanish and French, High School, White Plains, N. Y.

Collins, Hazel E.—Teacher of high school mathematics, High School, Mt. Vernon, N. Y.

Cook, Evangeline—Teacher of sixth grade, Miss Neuman's School, Detroit, Mich.

Cook, Rosamond C.—Professor of home economics education, University of Cincinnati, Cincinnati, O.

Cooper, Kenneth J.—Master in French, Lawrenceville School, Lawrenceville, N. J.

Corpron, Carlotta M.—Teacher of public school art, Woman's College of Alabama, Montgomery, Ala.

Craddock, Mattie A.—Instructor in clothing and textiles, Kansas State Agricultural College, Manhattan, Kan.

Culbertson, Winnifred R.—Instructor and supervisor of fine arts, Public School, Woodmere, L. I.

Culp, (Mrs.) Marguerite P.—Dean of John Gorry High School, Jacksonville, Fla.

Darby, Isabel—Teacher of Latin, Laurel School, Cleveland, O.

Darter, Oscar H.—Professor of history and sociology, State Teachers College, Fredericksburg, Va.

Davidian, Haig—Instructor in history, High School, Albany, N. Y.

Davidson, J. J.—Instructor in English, Deerfield-Shields High School, Highland Park, Ill.

Day, Grace A.—Director of primary education, Public Schools, Tulsa, Okla.

DeLong, Leo R.—Assistant professor of education, Gettysburg College, Gettysburg, Pa.

Dickinson, Cameron T.—Teacher of art, Pomona High School, Pomona, Calif.

Dodds, Theodora—Teachers of fine arts, High School, Madison, Wisc.

Doolittle, Ruby—Teacher of first grade, Shady Hill Country Day School, Philadelphia, Pa.

DuBois, Nellie A.—Head of art department, Loch Haven State Normal School, Loch Haven, Pa.

Duncan, Herman O.—Instructor in psychology, Teachers College, St. Cloud, Minn.

Dunsmore, Jessie—Director of training school, Temple University, Philadelphia, Pa.

Duvall, Sylvanos—Professor of religious education, Scarritt College, Nashville, Tenn.

Emmett, Marguerite—Teacher of mathematics, Albany High School, Albany, N. Y.

Erskine, Alice H.—Teacher of music, High School, Atlanta, Ga.

Finney, M. Louise—Instructor in psychology, Glassboro State Normal School, Glassboro, N. J.

Flegal, Mary E.—Director of art, State Normal School, Indiana, Pa.

Ganders, Harry S.—Professor of education, University of Cincinnati, Cincinnati, O.

Gilbert, Jane—Teacher of sixth grade, Lawrence School, Hewlett, L. I.

Hamilton, Otto T.—Instructor in department of education, North Carolina College for Women, Greensboro, N. C.

Hanway, Hannah F.—Teacher of fifth and sixth grades, Elementary School, Roslyn, L. I.

Harris, William — Superintendent of schools, Decatur, Ill.

Harrison, Dairy D.—Teacher of English, Haverford Township Junior High School, Upper Darby, Pa.

Hartman, Amelia — Instructor and charge of lunch room, Rosemary Hall, Greenwich, Conn.

Hatchett, Ethel L.—Assistant professor of education and English, Simmons University, Abilene, Tex.

Hawley, Margery—Supervisor of physical education, St. Joseph, Mich.

Henry, Charles—Director of teacher training, State Normal College, Dillon, Mont.

Hermann, Elizabeth B.—Teacher and head of school, Manhassett Bay School, Port Washington, L. I.

Heuser, Clare—Teacher of home making, Albany High School, continuation school, Albany, N. Y.

Hickerson, J. A.—Instructor in mathematics, Stewart Country Day School, Reading, Pa.

Hobbs, Gertrude—Teacher of domestic science, Public Schools, Hammonton, N. J.

Hooper, Bernice—Associate in physical education, University of California, Los Angeles, Calif.

Humphreys, Harry C.—Associate professor of education, University of Tennessee, Knoxville, Tenn.

Irion, Theo. W. H.—Professor of education, University of Missouri, Columbia, Mo.

Jenkins, Florence S.—Teacher in Training School, Hampton Institute, Hampton, Va.

Johnson, Bess E.—Assistant in education, State Normal, Geneseo, N. Y.

Jones, Galen—Principal of Port Arthur High School, Port Arthur, Tex.

Jones, Hazel E.—Physical director, Central High School, Kalamazoo, Mich.

Keener, Myrtle—Teacher of English, Junior College, Kemmerer, Wyo.

Kern, Gertrude M.—Instructor in kindergarten education, University of Ohio, Athens, O.

Kerns, Josephine B.—Primary instructor, East Stroudsburg Normal, East Stroudsburg, Pa.

Kerr, William D.—Assistant professor of the teaching of French, University of North Carolina, Chapel Hill, N. C.

Keys, Louisa—Teacher of home economics, Maryland State Normal School, Towson, Md.

Kizer, Charlotte E.—Supervisor of art, Lincoln City Schools, Lincoln, Nebr.

Krackowizer, Alice M.—Teacher of geography, State Normal School, Salisbury, Md.

Kriner, J. Roy.—Teacher of biology and general science, Mamaroneck High School, Mamaroneck, N. Y.

Langthorn, Mary A.—Instructor in physical education, Grosse Point School, Detroit, Mich.

Lansford, H. H.—Teacher of mathematics, High School, Elizabeth, N. J.

Lawing, John L.—Teacher of biology and chemistry, Chadron State Normal, Chadron, Nebr.

Lane, Florence A.—Teacher of methods in junior high school mathematics, New Paltz Normal School, New Paltz, N. Y.

Larson, Emil L.—Assistant professor of education, University of Arizona, Tucson, Ariz.

Leutsker, Alice T.—Instructor in tests and measurements, State Normal College, Chadron, Nebr.

Lewis, J. Louise—Supervisor of fine and industrial arts, Public Schools, Woodbridge, N. J.

Lindesmith, Emery L.—Vice-principal, Lincoln Junior High School, La Crosse, Wisc.

Little, Alice V.—Teacher of art, North Carolina College for Women, Greensboro, N. C.

Littlejohn, Elfleda—Instructor in public school music, State Normal School, Edinboro, Pa.

Longbridge, Rachel—Assistant professor of languages, Central Michigan Normal School, Mount Pleasant, Mich.

Ludington, Jesse P.—Teacher of mathematics, high school, Irvington-on-the-Hudson, N. Y.

Lynd, Mrs. Helen M.—Research associate, Lincoln School, Teachers College, N. Y.

MacCormack, Alice M.—Teacher of mathematics and science, Gridley Union High School, Gridley, Calif.

MacKnight, J. A.—Principal of American Academy, Guatemala.

McGuire, Grace A.—Chief dietitian, Randolph-Macon College, Lynchburg, Va.

McKee, William J.—Professor of education, University of North Carolina, Chapel Hill, N. C.

McMurren, E. L.—Sales Staff, The Century Company, New York, N. Y.

Martin, Delphia R.—Teacher of primary subjects, State Teachers College, West Chester, Pa.

Meares, Carrie E.—Traveling secretary, Young Women's Christian Association, Chicago, Ill.

Miller, George P.—Teacher and coach of athletics, Indiana Normal School, Indiana, Pa.

Miller, Harlan H.—Director of social science, Secondary Schools, Elizabeth, N. J.

Miller, Lillian L.—Principal of Boulevard School, Cleveland Heights, O.

Morphet, Edgar L.—Professor of education, Alabama Polytechnic Institute, Auburn, Ala.

Munro, Edna F.—Assistant professor of physical education, Illinois Normal University, Normal, Ill.

Nation, Seth—Instructor in psychology measurements and general science, State Normal School, Castleton, Vt.

Neulen, Leon—Supervisor of instruction, Public Schools, Champaign, Ill.

Nichols, Helene—Teacher of general science, Highland Park Junior High School, Highland Park, N. J.

Paul, Jessie L.—Assistant professor of pure design, University of Cincinnati, Cincinnati, O.

Perry, Clara H.—Head of English department, North Shore Country Day School, Winnetka, Ill.

Percival, Walther P.—Professor of education, State Normal, Indiana, Pa.

Peterson, Alice O.—Assistant to head of loss information bureau, National Board of Fire Underwriters, New York, N. Y.

Pickett, Lulu—Grade supervisor, Public Schools, Superior, Wisc.

Poley, Helen—Teacher of German, Battin High School, Elizabeth, N. J.

Preische, Amalie M.—Teacher of physical education, Hope Farm, Verbank, N. Y.

Preston, Newell T.—Professor of education, Blackburn College, Carlinville, Ill.

Prugh, Earl E.—Director of health education, Pennsylvania State Normal, Indiana, Pa.

Pryor, H. C.—Professor of secondary education, Kansas State Teachers College, Pittsburgh, Kans.

Pullen, Thomas G., Jr.—Principal of Catonsville High School, Catonsville, Md.

Rankin, Lois J.—Associate professor of physical education, University of Redlands, Redlands, Calif.

Rauch, Earnest—Teacher of science, Abington Township High School, Abington, Pa.

Reene, Alice M.—Teacher of mathematics, High School, Rockville Center, L. I.

Reichert, Marie—Teacher of physical education, Public Schools, Edgewater, N. Y.

Remer, Laura L.—Supervisor of kindergarten and primary, Eastern State Teachers College, Madison, S. D.

Robertson, Mary Louise, Director of physical education, Mary Baldwin College, Staunton, Va.

Roda, Frank C.—Teacher of shop work and mechanical drawing, Junior High School, New Rochelle, N. Y.

Rude, A. S.—Instructor in education, Oregon Agricultural College, Corvallis, Ore.

Rugar, George F.—Research chemist,

Diamond State Fibre Company, Bridgeport, Pa.

Runnals, Nettie M.—Dean of women and associate professor, Hillsdale College, Hillsdale, Mich.

Russell, Helen H.—Director of physical education, Eastern Kentucky State Normal, Richmond, Ky.

Samuels, Gertrude I.—Director of physical education, Keystone State Normal School, Kutztown, Pa.

Saxman, Ethel J.—Professor of physical education, State Teachers College, Maryville, Mo.

Schlipp, Margaret A.—Instructor in music, Temple University, Philadelphia, Pa.

Schuh, Irma P.—Instructor in physical education, Lippett School, Detroit, Mich.

Schwesinger, Gladys C.—Psychologist, Pelman Institute, New York, N. Y.

Scoville, Bernice—Assistant superintendent, Public Schools, Kenosha, Wisc.

Scudder, Mary T.—Dean of women, Winthrop College, Rock Hill, S. C.

Silverthorn, Hermione—Director of kindergarten-primary department, Santa Barbara, Calif.

Sorgenfrey, Estelle—Teacher of biology, East Carolina Teachers College, Greenville, N. C.

Spitzer, Lucy E.—Critic teacher of fourth grade, Maryland State Normal, Towson, Md.

Spooner, Ella J.—Educational director, Wright Bias Fold Co., New York, N. Y.

Stalker, J. Isabel—Teacher of English and history, Mt. Hebron Junior High School, Montclair, N. J.

Steele, Katharine M.—Principal of three-room rural school, Knott's Island, N. C.

Steinheimer, R. L.—Principal of Sherman Junior High School, Hutchinson, Kan.

Stowe, A. Monroe—Professor of education, Randolph-Macon Woman's College, Lynchburg, Va.

Struck, F. Theodore—Professor of industrial education and head of department of industrial education, Pennsylvania State College, State College, Pa.

Swan, G. Hazel—Instructor in teacher training, kindergarten-primary, Kent State Normal College, Kent, O.

Talbot, Elizabeth—Associate director of health and physical education, Buffalo Seminary, Buffalo, N. Y.

Towle, Nelle Sanborn—Teacher of training, East Stroudsburg Normal, East Stroudsburg, Pa.

Troeger, Eleanor E.—Instructor in physical education, Oklahoma Agricultural and Mechanical College, Stillwater, Okla.

Turner, Catharine—Instructor in domestic art, Milwaukee Vocational School, Milwaukee, Wisc.

Venable, Mary K.—Head of fine and industrial arts department, State Teachers College, Harrisonburg, Va.

Waite, Mary G.—Assistant professor of education, College of Education, University of Cincinnati, Cincinnati, O.

Watson, Katharine—Head of physical education, University of New Hampshire, Durham, N. H.

Weber, Marjorie J.—Director of physical education for women, Marshall College, Huntington, W. Va.

Weidemann, Charles C.—Associate professor of history, administration, University of Nebraska, Lincoln, Nebr.

White, Woodford—Teacher of science, Delta State Teachers College, Cleveland, Miss.

Whittemore, Margaret—Investigator in home economics, Rhode Island College, Kingston, R. I.

Williams, C. O.—Instructor in extension department, Pennsylvania State College, State College, Pa.

Williams, Irene—Teacher of home economics, Public Schools, Linden, N. J.

Williams, Mary N.—Assistant director of training department, State Teachers College, St. Cloud, Minn.

Winn, Marcia Howe—Instructor of physical education, University of Wisconsin, Madison, Wisc.

Wolf, Edna M.—Head of biology department, Western College for Women, Oxford, O.